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A NEW ENTOZOON FROM THE EEL.

BY REV. SAMUEL LOCKWOOD, PH. D.

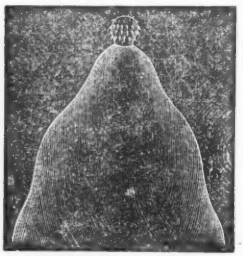
In the spring of 1869, while at work on the study of a question connected with the common eel, *Anguilla acutirostris*,* my attention was drawn to a small white speck embedded in a morsel of fat on the intestine of that animal. As said above, its color was white, while the fat of the fish is quite dark. It was this contrast that made it so easily observable, although it was of very minute size; for in its greatest length it was not much more than the one-twentieth of an inch; and its breadth at the forward end, which

*This name, *Anguilla acutirostris*, is one of the twenty and odd synonymes given to the common eel of Europe, first systematically referred to the genus under the name of *A. vulgaris*. Dr. Günther refers a specimen received from New Jersey and in the Liverpool Museum, to the same species as the European, but considers our common eel, which also has been described under many names, though best known under that of *A. Bostoniensis*, as distinct from *A. vulgaris* of Europe, although identical with specimens from China and Japan.

From extensive comparisons of specimens collected by the hundreds from the salt and fresh waters of Massachusetts, and from Lakes Champlain and Erie, with several from England and China, I have little hesitation in referring our *A. Bostoniensis* with all its marine and fluviatile uncles and aunts, grandfathers and grandmothers, back to its super great grandparents, to one and the same species with the common eel of Europe, uniting them all under the name of *Anguilla vulgaris*, or the *Muræna Anguilla* of Linnæus and the old writers. Either this must be done or almost every hundredth specimen collected must be regarded as the type of a distinct species, for a perfect series from long heads to short heads and long tails to short tails, thick lips to thin lips silvery color to black, etc., etc., can be made out of any large lot, and no set of character, can be selected as of specific value without finding them worthless for the purpose in almost the very next specimen taken in hand.—F. W. PUTNAM.

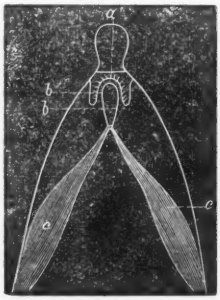
was the thickest part, was about one-eighth of the entire length. That it was an individual organism I had not the least suspicion. It was solely its white color, in such direct contrast with the dark adipose tissue, in which it was contained, that excited my curiosity. On this account it occurred to me that the microscope might reveal some difference in structure. Having put it under a lens of very moderate power, I was surprised to see a vermicular object, with the thick end truncated. Now a deep regret seized me; for I supposed that in the dissection of the eel, the most important part of this interesting specimen had been unwittingly cut off. The appearance thus presented in the microscope is shown in Fig. 120, where it looks like a worm with its anterior end excised. Thus regarding the object as ruined by an untoward accident, I was about to cast it aside, when lo! to my glad astonishment, the creature began a singular movement at the supposed decapitated end. Astonishment is not the word—it was in amazement that I gazed upon that strange movement. Such a sight could never be forgotten. Who does not remember the childlike delight at seeing for the first time a juggler draw the almost interminable cornucopia out of his mouth, until the mountebank's head looked like that of the fabled Unicorn? But that was only a smooth paper cone, after all; and the trick of it every schoolboy well understands. Not so with this feat of my puny capitve, at whom I had the lone privilege of gazing through this wonder-peering instrument. Like the sheriff, who was obliged on account of his pleasant bearing, to respect the unwelcome tenant whom he had just ejected; so I must confess that this unpleasant occupant whom I had ousted from its strange dwelling-place, had compelled my admiration, by a singular gracefulness of form and

Fig. 117.



Anterior portion of *Echinorhynchus gigas*, showing the projected proboscis, with rings of hooklets. (From Owen.)

Fig. 118.



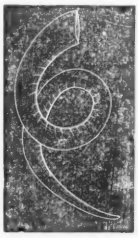
Longitudinal section of *E. gigas*, showing proboscis retracted, the hooklets still external. *a*, the oral pore. *bb*, the protractile muscles. *cc*, the retractile muscles. (From Owen.)

movement, albeit certain outré and weird-like accomplishments. With a slow, steady and uniform movement, a beautiful and tiny structure rises up, until the truncated end is capped or surmounted by a pretty little pagoda, with many circlets of hooks, the distance from ring to ring, being uniform. It was as if a miniature tower had risen out of a little crater, and covered it with its base. The whole structure is pellucid, like old milky-white china. So that now the end that seemed to be cut across is completed by having a cone projected on it as a base, the apex terminating almost in a point. At this extremity is a little pore, which probably serves whatever of oral function is needed, hence it may be called its mouth. Fig. 121. The evolving of that pretty cone was not only a beautiful sight to look at; but the method of its evolution was a grand thing to see into. As it rose slowly, it was a lengthening truncated cone, with a crater at the upper, or smaller end. And this cone, although without change at the base, kept steadily lengthening at its sides, and narrowing at the top, until at length the truncation, and the crater disappear together — the former in a rounded point, and the latter in a pore. Fig. 122, *a*, *b*, *c*, *d*.

Fig. 119.

Transverse section of *E. gigas*. *aa*, Lemnisci, attached to the sides of the neck by a thin appendage, and ending in a cul-de-sac, supposed to be nutrient processes. *bb*, cylindrical canals which adhere closely by the other side to the muscular fibre. *cc*, triangular spaces, filled with parenchymatous matter. *f*, dorsal ovary sack, or testis. *g*, Ventral ovary sac, or testis. (From Owen.)

Fig. 120.



Koleops Anguilla in repose, the proboscis withdrawn giving the truncated appearance.

But how could this be done? It should be mentioned that a similar extensile organ in other entozoa has been called by naturalists, from sheer poverty of language, the "proboscis." Hence there is no help for it; and we must use the same inexpressive word. There is a species to which our specimen is allied, which is known by the name *Echinorhyncus gigas*. Its proboscis, w en protruded, is of a spherical form, with a neck, or stem below; while at the top of the sphere is a slight projection, around which are several rows, or rings of hooklets. In the centre of the ring that surrounds the top is the oral pore. Figs. 117 and 118, *a*. Without regarding form precisely, but rather looking to function, let us liken the neck of the animal to the hand of a glove, and the proboscis to one of its fingers. Suppose that finger to be with-

drawn, or inverted. There are two ways in which I can revert the same. I may wish to do so by starting the tip end of the finger, as if I should push it out by pressing the end of a wire upwards, against the under side of the tip, which would in this way come out first: or I could, if I wished, push the finger out at the sides. This could be done, for illustration, by having in the hand part of the glove a tube or cylinder of the proper size, down which the glove finger has been neatly pushed, so as to fit snugly against the inner sides of the cylinder. Now if the cylinder be gently pushed upward, the glove finger will ascend on the outside of the cylinder having, as it rises, a crater-like depression at the top. The first of these methods illustrates the propulsion of the proboscis of *Echinorhyncus gigas:* and the second one shows the actual evolution of the proboscis of our new entozoon. It is done by the pushing of abductor muscles on the sides of the everting and lengthening cone.

Fig. 121.

K. Anguilla, with proboscis projected, showing the rings of hooklets.

It is noticeable of our species, that when the proboscis is returned into the body, the hooklets are all turned inside the proboscis. Fig. 122, *e.* This is not true of Echinorhyncus, which keeps its hooklets external to the proboscis, whether that organ is extruded or withdrawn. Figs. 117, 118.

Three real, and easily appreciable distinctions are now pointed out in these two helminths. They differ greatly in the form of the proboscis; also in the method of propulsion of the same, a method requiring for each differently adjusted muscles; and they differ in the position of the hooklets, when the respective probosces are inverted. It is plain then that our specimen belongs to a new genus.

As to their ordinal relations; both are members of Owen's second Class of the Entozoa, embracing the Sterelmintha, or Solid worms; and both evidently belong to Duvaine's Type iv., Acanthocephala, or Spiny Heads; and to Rudolphi's Order iv., which bears the same name. Now in this order there is but one genus, namely, Echinorhyncus, already mentioned; therefore we put in the order a new genus, to which we give the name *Koleops*, meaning "sheathed-head" and species *Anguilla*, because found in the common eel.

But the systematist may claim a word. If our name is to be accepted, the giving must respect the methods which Science regards as Orthodox. Accordingly the following is offered as sufficiently technical to be precise; and yet perfectly appreciable by the popular judgment.

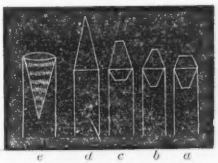
KOLEOPS ANGUILLA Lockwood (gen. et sp. nov.).

Description.— Solid. Form, vermicular, truncated at anterior end, when at rest; when in action the proboscis extended, making with body two cones united at their bases. Length, less than a line when at rest. Thickness at base about one-eighth of length. Proboscis encircled by rings of hooklets external to the cone and pointing backward; when the proboscis is retracted, the hooks are internal to the cone, and point forward. Color tallowy-white, pellucid. At extremity an oral pore.

Habitat.— In adipose tissue on the entrails of the common eel, *Anguilla acutirostris*. Specimen taken from an eel caught in Raritan Bay, near Keyport, N. J. Spring of 1869.

As to the use of those spiny circlets on the proboscis. While they can present but very little obstruction to the penetrating of that organ, the hold thus given the little parasite is very great; indeed it is certain that any attempt to dislodge it must fail, while these grapnels are buried in the tissue, and but for the peculiar muscular functions of the cone-like proboscis, its extraction must be fearfully lacerating, like the withdrawing of an arrow with many barbs. Certain it is that no human device could extract that tiara shaft of spiny rings, from the living tissue, without inflicting an agony beyond expression. When the butcher lifts the meat off his shamble hooks, he does it with a motion suited to the form of the hook, that he may not tear the meat. When Koleops would retract its thorny shaft, the process is begun at the extreme point, which of course is at the bottom of the wound; and how deftly, easily, yea, perhaps painlessly, this is done. Involution is begun at that extreme point. The end of the proboscis sinks downward within itself. In fact, it is not a withdrawing in the ordinary sense; for that would make the entire organism move at once, and every barb would tear. It is a gradual involving, beginning at the point, and of course, the first circlet of hooks is by this involving, everted from its hold, and inverted as respects the deepening crater of the now shortening truncated cone. Given the problem, economy of suffering, could a solution more admirable be afforded? It is to be observed that the instant the point of the proboscis reënters the neck on its return into the body, the

Fig. 122.



c *d* *c* *b* *a*

K. Anguilla: a, b, c, d, showing the progressive projection of the proboscis. *e,* showing position of proboscis when withdrawn, with the hooklets inside of the cone.

part without, or external to the neck, is a frustrum of a cone, while the part now within, or below the neck, is a lengthening cone, until the external frustrum wholly disappears, and the internal cone is complete; and the animal is at rest.

But little beyond conjecture can be said on the mode of use of the oral pore. It may be a sucking organ, thus imbibing nourishment. To me it seems that the entire external walls of the proboscis are functional in this direction; and during the slow inversion of this instrument, that is, while withdrawing from its hold, as each ring of hooklets is released, and involved into the crater of the returning cone, the limpid adipose flows over the crater's edge; thus the cone when returned contains a supply of nutriment. I hardly know how heterodox the view may seem to some, yet the idea presses me that the osmotic doctrine of a chemical impulsion of the nutrient fluids and gases, plays an important role in the nutritive system of these curious beings.

But my pen must stop with a confession. I must own that during the study, whose results have been given above, the so called repulsiveness of the subject was both unseen and unfelt, in the reverent sense that came upon me; so that in studying this singular organism, so lowly and so minute, with a functional structure so complete and complex, with adaptations so skilfully adjusted to a mission so mysterious—I found myself, not without emotion, repeating the sublime words of Saint Augustine: Deus est magnus in magnis, maximus autem in minimis.

NOTE.—An oral account of my discovery, with some blackboard chalking, was given to the N. Y. Lyceum of Natural History, May 12, 1869. November 14, 1871, I read a paper, giving the results of my study, before the New Jersey Microscopical Society. From that paper the principal facts given above have been taken.—S. L.

ON THE USE OF MONOCHROMATIC SUNLIGHT, AS AN AID TO HIGH-POWER DEFINITION.*

BY DR. J. J. WOODWARD, U. S. ARMY.

A FEW years ago I published, in the "Quarterly Journal of Microscopical Science" (Vol. vii, 1867, p. 253), some brief remarks

*Read before the Philosophical Society of Washington, March 9, 1872.

"On Monochromatic Illumination." These remarks were suggested by the perusal of a letter from Count Francisco Castracane published in the same journal some time before. (Ibid. vol. v, 1865, p. 249.)

Count Castracane's method consisted essentially in the use of a prism by which the sunlight was decomposed, and any selected color could be employed, blue or green seeming to him most advantageous. Mine consisted in passing the sunlight through a cell containing a saturated solution of the sulphate of copper in ammonia, which transmits a bluish violet light, admirably suited to high power definition and less fatiguing to the eye than any other color.

At the time I supposed Count Castracane's method to be new; the one I employed I ascribed to Von Baer ("Einleitung in die Höhere Optik" p. 48). I have since learned that I was in error in both particulars. The proposition to escape chromatic aberration by employing monochromatic illumination goes back in fact to a very remote period in the history of achromatic microscopes, and monochromatic lamps, as well as the use of the prism and of glasses and colored fluids as absorptive media, were early suggested. It would carry me away from my present purpose to go into a detailed history of the various attempts made from time to time in these directions. As the construction of achromatic objectives continued to improve, these devices fell into obscurity and it is only of late that attention has been directed to them anew. As for Count Castracane's method, without going further back, a full account of all the principles involved in the use of the prism for attaining monochromatic light to illuminate the microscope will be found in Chapter vii of the article on the microscope in the eighth edition of the "Encyclopædia Britannica" (American edition 1857, Boston, Vol. xiv, p. 798).

The use of the solution of the ammonio-sulphate of copper to exclude certain portions of the solar rays especially for photographic purposes, would appear to have been first suggested by one of our own countrymen more than thirty years ago.

Professor J. W. Draper published in the "Journal of the Franklin Institute" of Philadelphia, during the year 1837, a series of "Experiments on Solar Light" in the course of which several observations on the properties of the ammonio-sulphate of copper are recorded. In one of these papers (Loc. cit. Vol. xix, 1837, p.

473) he states that the ammonio-sulphate solution absorbs the red and yellow rays of the spectrum and with them so much of the heat that but "twenty rays, for every hundred that fell upon it," were transmitted.

In the London, Edinburgh, and Dublin Philosophical Magazine for September, 1840 (Vol. xvii, p. 217) the same gentleman published a paper "On the Process of Daguerreotype and its application to taking Portraits from the Life" in which he describes his attempts to reconcile the chemical and visual foci of portrait objectives, to escape "the effulgence" of the solar rays thrown directly on the sitter, as practised at that time, " abstract from them their heat and take away from them their offensive brilliancy." These are almost the very objects for which microscopists to-day resort to the copper solution. Professor Draper employed in his experiments "a large trough of plate glass, the interstice being an inch thick" filled with a dilute solution of the ammonio-sulphate. Its size was about three feet square. This was so fixed in the course of the sun's rays, reflected from a mirror upon the sitter, that his head and the adjacent parts were illuminated only by the light which had passed through the copper solution. By this device he reports he obtained excellent results.

In the spring of 1869 I received a letter from one of the sons of Professor Draper (dated April 19th) calling my attention to the above facts and transmitting several daguerreotypes of microscopic objects all bearing the marks of considerable age. These the writer (Prof. Henry Draper) states were made at various dates from 1851 to 1856. A Nachet microscope was used and in every case the ammonio-sulphate of copper is said to have been employed.

The results are not particularly good as compared with modern photomicrographs, but appear to me not much inferior to the best that could have been done by the daguerreotype method with the microscope used. The time was not yet ripe, and both microscopic objectives and photographic methods have vastly improved since those days.

My present purpose does not permit me to give greater space to these reminiscences, the real object of this paper being to indicate the best practical method to be pursued in obtaining economically the advantages of monochromatic sunlight for high power definition.

This object excludes a further consideration of the use of the

prism. It does its work admirably as I know by repeated trial, but the results are practically no better, even for photography, than those obtained by the use of the ammonio-sulphate cell, it requires greater skill to use, and the necessary apparatus is more expensive. For the same reason I shall say nothing in this article on the use of artificial lights, further than that both the prism and the ammonio-sulphate cell may be satisfactorily used with either the Calcium, the Magnesium or the Electric lights by those who are unable conveniently to secure the advantages of sunlight. The light of ordinary coal oil or gas lamps, however, is not suitable for the purpose.

Two very simple methods of securing the advantages of the ammonio-sulphate solution will now be briefly described.

(a.) I suppose the observer to be possessed of a good microscope stand, with achromatic condenser and suitable objectives. Then it is only necessary to prepare a proper ammonio-sulphate cell and fix it between the plane mirror of the instrument and the achromatic condenser. The microscope should be set near a window so that the direct rays of the sun fall on the plane mirror, while the head of the observer is protected by a convenient screen and all becomes easy.

(b.) A still better method for the resolution of lined test-objects with the highest powers, and one which is almost as simple as the foregoing is that described in my paper "On the use of Amphipleura pellucida as a test-object for high powers." (This Journal, April, 1872, p. 193.)

"Erect a perpendicular wooden screen about two feet square on one edge of a small table. Cut in this a circular hole an inch and a half in diameter at about the height of the under surface of the stage of the microscope. On the outside of this hole mount a small plane mirror which can be adjusted by passing the hand to the outside of the screen. On the inside cover the hole with the ammonio-sulphate cell." Now move the table to a window through which the direct rays of the sun can fall upon the mirror, and adjust this so as to throw the solar pencil nearly horizontally through the ammonio-sulphate cell. The mirror, and achromatic condenser, if the microscope has one, are removed and the microscope turned so that the solar pencil shall fall with the desired degree of obliquity on the under surface of the object. It will generally be best to condense the light upon the object by a small

ordinary lens, or still better by a low power objective mounted like a bull's-eye lens on a separate stand.

For prolonged observation, however, the motion of the sun will render it necessary to readjust the mirror from time to time, and the use of a heliostat becomes desirable. This gives the most satisfactory results no doubt, but the cost of the heliostat will, of course, prevent it from coming into general use except among those who desire to photograph what they observe, and the simpler methods above detailed will answer very satisfactorily for every other purpose.

The ammonio-sulphate cell used in either method should be made of two pieces of thin plate glass about two and a half inches square, held apart by thin strips of plate glass, or by a square of plate glass suitably drilled. The point is to obtain a layer of the blue solution about $\frac{1}{4}$ of an inch thick between two parallel planes of plate glass. The best cement for the purpose according to my experience is old Canada balsam applied hot; but many other devices may be employed. The solution is made by saturating strong *aqua ammonia* with sulphate of copper and should be strained or filtered so as to be free from all solid particles. A sheet of fine blue glass may be substituted for the ammonio-sulphate cell but only with tolerable results; at least, I have never had a sample of blue glass which was of just the right color.

The selection of the best condenser for high power definition is a matter which has recently elicited much discussion. In a general way I may say that any condenser will do its best work under the conditions above indicated if skilfully used. For the benefit of those who possess first class stands but have never purchased an achromatic condenser it may be stated that almost any objective suitably mounted on the secondary stage can be made to answer instead, the best results being attained when the angle of aperture of the objective thus used is rather less than that of the one employed to magnify the preparation, and when the secondary stage is capable of being centred or decentred at pleasure by screws working at right angles to each other. An ordinary low power objective (of one to three inches focal length) mounted on a separate stand and used to throw the light obliquely as already described is, however, perhaps the most convenient and efficient mode of illuminating lined test-objects with high powers.

As to the objectives suitable for monochromatic illumination,

the best compound objectives of some first class maker should be selected. It is a mistake, to suppose, as some have done, that a single lens can be substituted for the modern carefully corrected compound objective, even if the pure monochromatic light of a narrow portion of the solar spectrum as obtained by a prism were employed. For the objective always requires to be corrected for spherical aberration, and in the case of high powers must be provided with a screw collar to modify the distance between the posterior combination and the front one in accordance with the different thickness of the covering glass of the preparation. Now practically the spherical aberration is best corrected by the just combination of crown and flint glass, and combinations very nearly the same as those employed for white light would still be necessary if the objective were made for exclusive use with monochromatic illumination.

Under these circumstances I do not recommend the use of monochromatic illumination for low or medium powers except when photographs are to be made. It is only as an aid to high power definition that I here commend it. With its aid objectives incapable of resolving certain difficult tests (such as Amphipleura pellucida, Grammatophora subtilissima, etc.) with white light, show them in a satisfactory manner, and those which even with white light are capable of displaying the most difficult tests, exhibit them with greater clearness and distinctness. I attribute this result chiefly to the well known fact that the chromatic correction of our very best modern objectives is far from perfect, more or less of a secondary spectrum being always visible, and interfering with distinct vision. Moreover many of the objects we desire to examine are themselves capable of producing enough chromatic dispersion to interfere with our perception of their true form. Both these evils are escaped by the method here described. I do not advise it as a substitute for other modes of using the microscope, but as a special means of research to be reserved for occasional use in connection with the higher powers of the instrument.

I have frequently been asked to express an opinion as to whether the use of monochromatic sunlight is likely to prove injurious to the eye of the observer. On this subject I can speak from an extensive personal experience in connection with photo-micrography. The only injury to my own eyesight of which I have ever been conscious was produced by an injudicious exposure to the elec-

tric lamp. If the microscopist so manages his illuminating apparatus that the field of the microscope resembles in color and intensity the azure blue of the sky on a clear day (and this is the condition which should always be aimed at), I do not believe the use of the method for any reasonable time will be found injurious. I have recently found, when a sheet of plate glass backed with black velvet is substituted for the ordinary plane mirror in any of the above arrangements, that while the brilliancy of the light is much moderated, its desirable qualities are unchanged and it is still intense enough for the adequate illumination of the highest powers. Those who find the light obtained from the ordinary mirror too brilliant may resort to this contrivance with advantage.

SOME OF THE FAMILIAR BIRDS OF INDIA.

BY REV. H. J. BRUCE.

One is greatly surprised at the number of birds found in India. Dr. Jerdon in his "Birds of India," published in 1863, describes ten hundred and sixteen species, and since that time the list has been so much enlarged by new discoveries, that Mr. Allan Hume, in the second part of his "Rough Notes," announces thirteen hundred and sixty species as already acknowledged and identified. It cannot be supposed that this number includes all the avi-fauna of India, Burmah and Ceylon; for new species are constantly being discovered and added to the list as the number of observers is increased, and new localities are visited.

India possesses almost every variety of climate, from the snowy Himalayas on the north, to the arid plains and table-lands of the tropical south. The variety of surface, too, is very great. Whether upon the extended sea coast of several thousand miles, or upon the mountain cliffs and crags; in the immense forests of Malabar and Central India, or the thick jungles of the Ghauts and Ceylon; in the shady ravines or the open country; upon the large rivers and lakes or in the salt marshes, almost every kind of bird can find those conditions which are best adapted to its nature and wants. It is to be remembered also that this country forms the southern-

most limit of the Asiatic continent, and it is therefore the winter residence of a vast number of species which migrate from the colder regions of central Asia, and even from Europe. The Himalayan range forms no impassable barrier to them in their journeyings north and south; but, taking advantage of favoring valleys and mountain gorges, they have chosen for themselves great highways, over which they pass and repass as the changing seasons require. Dr. Stoliczka has recently discovered one of these highways in the valley of the Sutlej in the northwest Himalayas. This valley forms an almost direct passage through the lofty mountain ranges, from the plains of India to the elevated table-lands of Central Asia. In a distance of one hundred and ten miles it ascends from one thousand to thirteen hundred feet, and Dr. Stoliczka found there many species of birds which one would not expect to find in such an elevated mountainous region.

Rahouri is situated on the bank of the Mûla river, in the broad valley of the Godavery, twenty-three miles northwest from Ahmednuggur. The country round about is open plain, and the land for the most part is fertile. Immediately around the village are a large number of gardens which are more highly cultivated and irrigated by water drawn from wells by bullocks. There are a great many trees, of various kinds, in these gardens, and it is therefore a favorable locality for many of our familiar birds. Without attempting to include in this list all the birds found here, I propose to restrict myself to those which I have seen from my study window, and in my own garden. In front of my window, one hundred feet distant, is a thick hedge of Milkbush (*Euphorbia tirucalli*) fifteen feet high, and upon either side of the intervening space are a number of acacias and other trees. The garden is a much larger enclosure, surrounded by the same hedge and containing many trees of different kinds. With limits thus circumscribed, our list will, of course, include only a few of the most familiar birds.*

Neophron Ginginianus. The white scavenger vulture. This was formerly supposed to be *N. percnopterus*, the "Pharaoh's chicken" of Egypt, but is now acknowledged as a distinct race.

Hieraëtus pennatus. The dwarf, or booted eagle. Often seen among the common kites, and it so much resembles them in size

* With two or three exceptions all the birds included in this list, and many other Indian species, may be seen in the Museum of the City Library Association in Springfield, Mass.

and general coloring that the inexperienced observer finds it difficult to distinguish the two when flying at a little distance from him. It is wary, but more predacious than the kites, not unfrequently seizing a chicken or some other small animal from the ground. But, as Dr. Jerdon says, its depredations are usually laid to the charge of the kites, for the reason that the common native people do not distinguish it from them. It is wonderful how widely extended the range of this eagle is. It is found throughout India and Burmah, in Western Asia, Southern Europe and Northern Africa, and has recently been reported from South Africa. Mr. Blyth also thinks that the Australian *Hieraëtus morphnoïdes*, is not to be distinguished from this species.

Poliornis teesa. The white-eyed buzzard.

Milvus Govinda. The common pariah kite. Among the first objects that attracted my attention when I landed in India were the kites and crows, and I have scarcely been out of sight of them very long at a time since. They are very abundant in all parts of India, and no representation of Indian scenery would be quite complete without some of these birds in the foreground. The common kite performs a very important office as a scavenger. It is generally seen sitting upon the ground, or upon houses or trees, or sailing about with easy and not very rapid motion over the villages or cantonments watching for any bits of refuse which may serve for food. When these are discovered the kite does not think it necessary to light upon the ground to secure them, but swooping rapidly down it seizes the prize with its claws; or if the first swoop fails a second or third quickly follows. But after seizing the coveted morsel he is a lucky fellow if he is able to retain it. Others of his own species seeing his success, will sometimes rush upon him and attack him with such fury that he is ready to drop the prize to escape from them. If unmolested, however, he will devour his spoils either upon the wing, or seated upon some neighboring house or tree. It is surprising how quickly the kites will discern an object and recognize it as an article of food. I have myself thrown a small bird out upon the ground with considerable force, and almost before it stopped rolling upon the ground, a kite, which was unseen before, swooped upon it and carried it away in triumph.

The kites are sometimes exceedingly bold and often very troublesome. The people in this country are accustomed to carry almost

every kind of burden upon the top of their heads, and it is no uncommon thing for a kite to make a sudden swoop and possess himself of a part of their burden, when it is anything that he desires for food. I have seen them attempt to seize food out of the hand of a man. It was done so quickly that the audacious robber, whether successful or not, was far away before the astonished victim could recover from his surprise. They consider it, however, much safer to take liberties with children than with older people. Several years ago my own child, then two years old, was accustomed to take a piece of bread in his hand and go out each afternoon to play in the shadow of the bungalow. On several successive days we were suddenly aroused by a great outcry from the child, and on going to him found that a kite had unceremoniously robbed him of his food. I made every effort to shoot the troublesome bird, but, as if aware of my purpose, it quickly disappeared whenever I came in sight. At length, however, after several days' manœuvring, quite contrary to its usual custom it cautiously flew over my head, and — well! it troubled the child no more.

Mr. Hume says that "there are certainly two distinct species of kites in India." The second species is much larger than *M. Govinda*, and Mr. Hume has named it *M. major*. It is "a wild wary bird, very difficult to approach and is found only in the open fields, or in swamp or jungle." Hence very few specimens of this "larger kite" have ever been obtained, although it has been repeatedly seen, recognized and pursued, both by Mr. Hume and others. Besides this, Mr. Hume thinks that it is by no means improbable that the Australian *M. affinis* and the Chinese *M. melanotis* may be found within our limits. The Indian kites seem never to have been examined with that thoroughness with which most other families of Indian birds have been. Certain it is that in the great multitude of kites all about us, there is a vast difference in many of the individuals, both in respect to size and coloring; but whether this is owing to a difference of species, or only to the conditions of age and sex, can be determined only by careful examination of a large series of specimens. *Milvus Govinda* seems to be nearly confined to India, Burmah and Ceylon. A few specimens only have been recorded from the Andaman Islands.

Athene Brama. The spotted owlet.

Cypselus affinis. The common Indian swift. Very abundant

at times, even entering verandahs and houses, and then again not seen at all for many months.

Caprimulgus Asiaticus. The common Indian nightjar.

Caprimulgus———. Nightjar. A single specimen shot upon the ground close beside the bungalow. It is of a remarkably light color, and apparently differs from any described by Dr. Jerdon.

Merops viridis. The common Indian bee-eater. There are three Asiatic varieties of this bird which Mr. Blyth thinks are "about as well worthy of separation as is the African variety from either one of them." The blue-throated variety, or Hodgson's *M. torquatus*, seems not to be uncommon in this region.

Coracias Indica. The Indian roller. This beautiful bird is regarded by the natives with great superstition. If the traveller sees it sitting upon his right, and can pass without raising it, it is a good sign; but if it is on his left he despairs of accomplishing the object of his journey. Hence he will sometimes run with all his might across the neighboring field in order to leave the bird upon the right hand side of his path.

Palæornis torquatus. The rose ringed parrakeet. Very abundant and noisy, and destructive to the crops of fruit and grain. It flies with great energy, and when on the wing always seems to be *in a hurry.*

Hantholæma Indica. The crimson-breasted barbet. The only barbet found in this region.

Coccystes melanoleucus. The pied-crested cuckoo.

Centropus rufipennis. The common coucal or crow pheasant.

Arachnecthra Asiatica. The purple honey-sucker. This is the most widely spread of all the Eastern sunbirds. The male, in breeding plumage, with its glossy, purplish black body, and crimson and yellow axillaries, is a very beautiful object. Of the thirteen species of Indian honey-suckers this is the only one found in this vicinity.

Upupa nigripennis. The Indian hoopoe.

Lanius erythronotus. The rufous-backed shrike.

Lanius Hardwickii. The bay-backed shrike.

Pericrocotus peregrinus. The small minivet.

Dicrurus macrocercus. The common drongo shrike.

Tchitrea paradisi. The Paradise flycatcher. A single specimen, a fine adult male, shot in the hot season of 1869. It is com-

mon in the more highly wooded districts along the Western Ghauts.

Leucocerca albofrontata. The white-browed fantail. An occasional visitor to the trees in front, and always welcome for the beauty of its song as well as the oddity of its manners.

Cyornis banyumas. Horsfield's blue red-breast. The female of this bird is not, as Dr. Jerdon supposes, "olive brown above." I have repeatedly obtained undoubted females, determined by dissection, which differed from the males only in having the colors slightly more dull. An allied species, *C. ruficauda* has been found in this vicinity, but all my specimens have proved to be females. It is still a question whether this last is a good species, or whether it is the female of some other race.

Petrocossyphus cyaneus. The blue rock thrush. According to Dr. Jerdon and the Rev. H. B. Tristram this, and not *Passer domesticus* is the "sparrow" of Ps. cii, 7, that sitteth "alone upon the housetop."

Malacocircus Malcolmi. The large gray babbler. Very abundant and exceedingly noisy.

Pycnonotus pusillus. The common Madras bulbul. Distinct from the *P. hæmorhous* (Gmelin) of authors.

Oriolus kundoo. The Indian oriole.

Copsychus saularis. The magpie robin.

Thamnobia fulicata. The Indian black robin.

Ruticilla rufiventris. The Indian redstart.

Acrocephalus dumetorum. The lesser reed warbler.

Prinia socialis. The dark ashy wren warbler.

Drymoipus longicaudatus. The long-tailed wren warbler.

Phyllopneuste rama. Sykes' warbler.

Sylvia affinis. The allied gray warbler.

Motacilla Dukhunensis. The black-faced wag tail. During the cold weather when this bird is with us its whole face to the top of its head is pure white. The observer in this latitude therefore fails to see the propriety of the English name that has been given to it.

Budytes viridis. The Indian field wagtail. The green wagtails are very difficult of identification. Mr. Hume thinks that there are at least six species in India, only two of which occur in Dr. Jerdon's list.

Corvus culminatus. The carrion crow. Of the seven species

of crows found in India only two are seen here. This species is very common but not nearly so abundant as *C. splendens*. I have never been able, however, to obtain specimens which approached in size the measurements given by Dr. Jerdon. The largest specimen, I think, that I ever obtained, measured but nineteen inches in length, whereas Dr. Jerdon gives its length as twenty-one inches.

Corvus splendens. The common Indian crow. The common Indian crow is everywhere found in surprising numbers, and it retains all the wariness and cunning which are characteristic of its class. It is amusing to see its excessive caution when it has reason to think that one has evil designs concerning it. It stands with its neck stretched forward and its wings partly spread ready for instant flight, while its eye is cocked and it watches every indication of war or peace. The slightest hostile movement, or even a steady look will often send it away; but sometimes it seems to know that it is being imposed upon, and then it merely jumps upon a more distant branch of the tree, or if on the ground flies a few feet away. It is exceedingly quick to comprehend the situation of affairs, and to avail itself of any opportunity to secure its food.

I once saw, in the city of Poona, an old woman sitting by the roadside with a basket of sweetmeats for sale. Not finding trade very brisk, however, she had leaned her head against a tree and fallen asleep. The crows seemed to comprehend the case at once, and they began to sidle up, in their own peculiar way, to help themselves to the contents of the basket. Probably the old woman found them anything but profitable customers.

There seems to be an element of justice in the constitution of this crow, as well as in some of its congeners, at least they are accustomed occasionally to inflict punishment upon certain guilty members of their community. I was once fortunate enough to witness their administration of justice. Hearing an unusual commotion among the crows in my garden I went out to see what was the trouble. A large number of crows were assembled and were mostly standing upon the ground. In the midst of them was one which seemed to be the prisoner, and three or four others which were apparently the executioners. They fell upon the prisoner with great violence, pecking him upon the head, pushing him, and pulling his feathers, while the prisoner meekly submitted to his punishment without trying to escape or to retaliate. I did not

learn what crime the prisoner had committed, but, judging from the punishment he received, it must have been very great. When the punishment had been inflicted and justice maintained, the prisoner was released. After standing quietly for a moment he flew away, and was probably ever afterward "a sadder and wiser" crow. The court also adjourned, and the assembly broke up.

It is often mentioned of this crow that it roosts in company, in vast numbers, assembling for that purpose from the whole surrounding country. The late Capt. Beavan says, "At Umbullah I have observed crows in large numbers flying along the grand-trunk road over twenty miles of an evening, for the sake of roosting in the station, returning in the morning the same distance." There are some large trees in the Collector's garden at Ahmednuggur which serve as a roosting place for these birds. From before sunset until dark the crows may be seen in great numbers coming from all directions for their night's lodgings, and in the early morning they return again to their various hunting grounds. I will venture to say that they are the most industrious collectors of revenue that emanate from that place.

Acridotheres tristis. The common myna. This is one of our most common and familiar birds, and it is rather a favorite, partly because of its cheerful and *dignified* appearance, and partly because it has such a great variety of notes; more than once have I heard a strange, unknown song, and on going to my window to discover its source have found only my old friend the myna. Some of its notes are not very musical, it is true, but they are always so cheerful, so rollicking, that it is a pleasure to have it about. There is one striking peculiarity about this bird. It has a row of white or silvery specks around its red-brown irises. This when seen near at hand gives it a singular appearance. So far as I know, none of its allies has this peculiarity.

The myna is by no means a timid bird. It is able to stand upon its dignity and to defend its rights when occasion requires. Mr. Hume speaks of a male in defence of his household treasures, "rushing after and soundly thrashing any chance crow (four times his weight at least) that inadvertently passed too near him." I have seen a pair of them in front of my window attacking most furiously a medium sized cobra that came within a few rods of their nest. His snakeship was making the best of his way to a neighboring hedge, when, without waiting for the formality of

putting on my hat, I seized a stick and ran out in the hot mid-day sun to the assistance of the brave birds. After a short conflict the reptile was safely housed in a bottle of alcohol.

The common myna has been successfully introduced into the Mauritius and Andaman Islands. Dr. Carpenter says of this bird, "In the Mauritius, the increase of locusts, which had been accidentally introduced there, and which were becoming quite a pest, was checked by the introduction from India of a species of bird, the grackle, which feeds upon them." (Animal Physiology, Paragraph 149.) Why might it not be introduced into the Southern States of America? It thrives in Northern India in latitude equal to that of the Gulf States, and at an elevation of five thousand feet.

Temenuchus pagodarum. The black-headed myna. This species is more seasonal in its appearance, and is far more quiet and retiring in its habits than the common myna. It is a beautiful little bird, and, as Mr. Hume says, "there is something essentially gentlemanly in his look; he is always so exquisitely glossy, neat and clean, and he always looks so perfectly independent and so thoroughly good humored."

Pastor roseus. The rose-colored starling. The rose-colored starlings are said to breed in Western Asia and in Southern Europe. They make their appearance here during the cold season in time of harvest, and make great devastation in the fields of grain. In the evening they assemble in countless numbers at their chosen roosting places, either in trees, or in a thick growth of prickly-pear. I have seen them in vast cloud-like flocks flying back and forth over their roosting place for several minutes, and then they would suddenly dart, like an arrow, into the prickly pear and settle themselves for the night. On one occasion one of these flocks was fired into on two nights in succession, and on the third night, not a starling was to be seen at that place.

Munia Malabarica. The plain brown munia.

Passer Indicus. The Indian house sparrow. One does not always have to look out of the window to get a glimpse of the Indian house sparrow. They are abundant everywhere, in the house and out of it, and they are as mischievous and impudent as they are common. They are exceedingly industrious and persevering in their mischief, working away for days and weeks at any little hole they may find in the walls and ceiling until they have

enlarged it sufficiently to give entrance to themselves and the rubbish which they require for their nests. Its chirp is loud and shrill, and is continued with such pertinacity as to become extremely annoying. Indeed Dr. Jerdon pronounces this bird and the common squirrel (*Sciurus palmarum*) "two of the greatest pests in India." The ill-mannered creature has no regard for sacred places, but enters the churches and chapels with the utmost freedom, screaming out its loudest notes, being provoked thereto, perhaps, by the singing of the congregation. I have been almost distracted when preaching to a native assembly, by half a dozen or a dozen of these noisy creatures chirping with all their might over my head and in every part of the room. It is of little use to drive them out; for if they are driven out through the door they will come in at the window, and if through the window they will return at the door. Their persistence is more than a match for human patience, nothing short of decapitation seems to be sufficient to keep them from their mischief. I have suddenly closed the doors and windows upon them, and chased them back and forth until in their fright they have fallen helpless to the floor; have taken them in my hand and done everything to frighten them, but out of sheer pity have let them go alive, only to have them return to their work of destruction at the first opportunity.

I have been more particular in describing this bird because of the recent attempt to introduce a closely allied species (*Passer domesticus*) into America. I confess that I look with some apprehension upon these efforts which I believe to be ill-advised and inexpedient. The European house sparrow does not differ essentially in its habits from its Indian ally, and so far as I can learn, it is very generally regarded as a nuisance wherever it abounds. In some parts of England a bounty is placed upon its head and considerable sums of money are paid for its destruction. In Spain it is said by Mr. Howard Saunders to be "as abundant and impudent as elsewhere." The *Passer domesticus* is the common sparrow of Syria, according to the Rev. H. B. Tristram, who says of it, "in its westward migrations it has acquired neither additional impudence, assurance nor voracity." Dr. Thomson also describes these same Syrian sparrows in the following spirited style. He says: "They are a tame, troublesome, and impertinent generation, and nestle just where you don't want them. They stop up your stove and water pipes with their rubbish, build in the windows and under the

beams of the roof, and would stuff your hat full of stubble in half a day if they found it hanging in a place to suit them. They are extremely pertinacious in asserting their right of possession, and have not the least reverence for any place or thing." (Land and Book, Vol. 1, page 58.)

If the sparrow is to be introduced into America to devour the larvæ of insects it should be remembered that it is for the most part a feeder on grain, seeds and buds and that it only makes a business of devouring grubs during its breeding season. If it is true, as has been estimated, that a pair of them will devour four thousand caterpillars a week during their breeding season, still that season continues but a small part of the year, during the remainder of which they may cause a great amount of destruction.

I trust that those who have to do in this matter will act advisedly, lest they should introduce that which will eventually become as great a nuisance, in its way, as the curculio and the cankerworm.

Of the five other species of Indian sparrows only one is found in this region. The *Passer flavicollis*, or yellow-necked sparrow, is altogether more modest than the preceding, and is, indeed, a very different sort of a bird. It does not intrude itself into the society of man, but frequents thin forest jungle, groves of trees and gardens. It has a very pleasing song which it pours forth from its golden throat, seated upon the topmost twig of some lofty tree.

Emberiza Huttoni. The gray-necked bunting. This can hardly be called a familiar bird in the sense to which we have restricted that term, although I have *twice* seen it gathering its food upon the ground in front of my window; I mention it here more particularly to correct an error in regard to its supposed limited distribution. Dr. Jerdon gives its habitat as the N. W. Himalayas, but thinks it may be "a rare straggler into Western India." Mr. W. T. Blanford obtained four specimens in 1867, in the vicinity of Nagpore and Chanda, and reports them as having "not previously been found so far to the South." Rahouri is considerably farther south than the places mentioned by Mr. Blanford, and I have seen them here in large numbers during the past year. I cannot however explain the apparent suddenness of its appearance. I never saw it to recognize it until two years ago, and then only a few specimens, but during the last cold season it was very common, in various localities of hill and plain.

Euspiza melanocephala. The black-headed bunting is present

in vast multitudes during the cold season, and this year (1871), up to the first week in April, a whole month later than is mentioned by Dr. Jerdon.

Columba intermedia. The blue rock-pigeon.

Turtur Cambayensis. The little brown dove. Very abundant and tame, building its nest sometimes on the verandah within reach of the hand.

Turtur Suratensis. The Spotted Dove. Occasional. Very beautiful.

Turtur risoria. The common ring-dove. Very abundant. This is a very widely distributed species. It is one of the three common doves of Palestine, and is found in Asia Minor, and even in European Turkey and Northern Africa. It has also been introduced into New Zealand.*

Ortygornis Ponticeriana. The gray partridge. Often seen in small companies about the hedges.

Anthropoides virgo. The demoiselle crane. A very common and beautiful sight in the cold season is a flock of these magnificent birds flying overhead. They are generally in a straight or wedge-shaped line, and sometimes form a double line. They usually number from twenty-five to a hundred in a flock, but they sometimes appear in astonishing numbers. Occasionally, too, they rise to an immense height, so as hardly to be visible, or even to disappear behind the clouds. During the day they sit in the sandy beds of rivers, but they are very shy and difficult to approach.

REVIEWS AND BOOK NOTICES.

SCIENTIFIC RECORD.†— We are glad to see that the admirably edited "Scientific Intelligence" which the Messrs. Harper have been publishing of late in their Weekly and Monthly has been put

*I have observed a very curious habit of this bird which I never saw noticed in any published account. A sudden shower of rain was one day falling after some weeks of dry weather. On going to my verandah I saw, not far off, numbers of these birds lying upon the ground, mostly upon one side, with the opposite wing spread and bent as far as possible over the back. I watched them for some time and found that their object was evidently to cool themselves by allowing the large raindrops to fall upon the thinly clad portions of the body under the wing.

†Annual Record of Science and Industry for 1871. Edited by SPENCER F. BAIRD, with the assistance of eminent men of science. New York: Harper and Bros. 1872.

in more permanent and accessible form, with the addition of a good deal of matter, original and compiled, which was not suitable for the columns of a popular periodical. Professor Baird, of course, needs no introduction to the readers of the NATURALIST, nor is any endorsement of the quality of work he offers, required; we may simply say that in points of perspicacity, comprehensiveness and thorough reliability, the present volume matches former ones from the same high source. Those who have not seen the "Record," may be interested to know that it is a digested and methodically arranged abstract of the leading scientific discoveries of the past year, representing the cream of current literature in Science and Industry. It will prove an extremely useful and convenient handbook to all who desire a general knowledge of what is going on in the scientific world, and recommends itself particularly to the large class whose tastes have made them readers and friends of the NATURALIST. — E. C.

THE BOSTON SOCIETY'S ORNITHOLOGICAL CATALOGUE.*—We are informed by Prof. Hyatt that "a catalogue of the birds in the possession of this Society is here begun" — a statement alone sufficiently interesting; and after a particularly thorough examination of the first number, it is the more gratifying to learn that "*similar* series of observations upon the genera and species will be published." The value of even a bare museum catalogue is appreciated by working ornithologists; and how very important this class of work may be made, is shown by the position that Schlegel's work on the Leyden museum has taken. With a due sense of what is implied in the remark, we judge that if Prof. Hyatt continues to work in the same vein, the Society's "Catalogue" will compare favorably with the one just mentioned. It is true that we recognize, by many tokens, a hand unaccustomed to work in this particular department, but it is equally true that we find the subject adequately and successfully treated; it receives a fresh and vigorous touch bringing out some points that have not hitherto received due attention. The author shows plainly the qualities of the trained naturalist, which have distinguished him in his own specialties. The specific determinations, to which we assent in every instance, are the same, for the nine species in the collection, as

*Catalogue of the Ornithological collection in the Museum of the Society. I. *Sphenisciдæ*. By Alpheus Hyatt. 1871.

those of Dr. Schlegel's; the birds are, however, referred to four genera, instead of one, and for this, excellent reason appears. We would only remark in the matter of synonymy, that *Aptenodytes* "*Pennantii* GRAY" is antedated by "*longirostris* SCOPOLI," while "*papua* FORST." should be cancelled, on the score of being geographically inept, in favor of "*tæniata* PEALE." Our own slight connection with the paper, in the shape of some osteological memoranda, must of course not stand in the way of our according the high praise that Prof. Hyatt's work merits. — E. C.

DESCRIPTION OF A SPECIMEN OF BALÆNOPTERA MUSCULUS.* — As is well known, no mammals more rarely fall under the observation of naturalists than the larger Cetacea, and hence the detailed and careful description and illustration by figures, of the skeleton of even a common species, is a valuable contribution to science. As a group, the Cetacea apparently present a remarkable range of individual variation, in consequence of which both species and genera have been unduly multiplied, a large number of supposed species being at present known only from single and often imperfect specimens, and in some cases merely from a few disconnected bones. Those who have had an opportunity of studying the largest number of specimens appear generally disposed to favor a considerable reduction of the number of described species. In the present memoir, Dr. Dwight has given a detailed and very satisfactory description of the osteology of apparently our most common species of finback whale, which he believes to be identical with the *Balænoptera musculus* of Van Beneden and the older authors, or the *Physalus antiquorum* of Dr. J. E. Gray.

"The task undertaken," the author observes, "is to add one to the list of thoroughly described skeletons, and to endeavor to show that the range of purely individual variations is greater than is generally admitted." In addition to the description of each bone, and generally a comparison of it with the published descriptions and figures of other specimens, he has added an interesting table, showing the comparative breadth of the skull and beak of eleven described specimens, which indicates that while the Society's specimen scarcely differs from the average, the range of

* Description of the Whale (*Balænoptera musculus* Auct.) in the possession of the Society; with remarks on the classification of Fin Whales. By Thomas Dwight, jr., M.D. Mem. Bost. Soc. Nat. Hist., Vol. II, pp. 203-230. 11 woodcuts and 2 plates. June, 1872. (Read May 17, 1871.)

variation, in the proportion of the elements mentioned, amounts to nearly twenty per cent. of the average. "In some cases," Dr. Dwight observes, "both skull and beak exceed the average breadth; in others both fall short of it, and again, in others sometimes one part, and sometimes the other is out of proportion." From the general consideration of the subject, Dr. Dwight seems to favor the opinion that the so-called *Physalus Duguidii* is hardly distinguishable from the present species. He further remarks:

"When the large number of points in which this whale is peculiar is considered, it can not be denied that bolder feats in classification have been attempted than would be requisite to found a new species on this specimen. Such a course, however, would be quite unjustifiable. It is to be particularly noticed that these variations do not point in any one direction; that if in certain aspects this specimen approaches a certain other, yet in others equally important, it may resemble a third which is quite unlike the second, and in still other respects be different from both. A slight study of the writings of the eminent observers so often quoted will be sufficient to show that the same is true, to a greater or less extent, of perhaps every well described specimen of the species." (p. 229.)

Besides the woodcuts illustrative of many of the bones, a large lithographic plate is devoted to figures of the skull and other important osteological features, and in another plate are given dorsal, ventral and profile views of the animal, accurately drawn soon after its capture by Mr. J. H. Blake, of the Museum of Comparative Zoölogy, and also a table of external measurements. —J. A. A.

The Habits of the Orca.* — It is not often that we find in popular magazines of the day, articles on natural history subjects containing original matter of a character that commends them to the attention of naturalists. But in this very readable paper of five pages, Captain Scammon has given us valuable information respecting the habits, distribution and external characters of a little known group of marine mammals, — the Orcas, or the carnivorous Cetacea, of the Pacific Coast of North America, — based on many years of personal observation. The apparently fabulous

* The Orca. By Capt. C. M. Scammon. Overland Monthly, July, 1872, pp. 52–57, with three outline figures.

stories of the strength and voracity of the "killers," popularly current among seafaring men, seem now hardly exaggerations of the truth. Though apparently only rarely attacking the larger cetaceans, they prey with great rapacity upon their young and the smaller species, as well as also upon seals and the larger fishes. Even the powerful old male sealions and the full grown walruses, are said to endeavor to avoid them, while their ability to kill the largest of the baleen whales seems fully established. The species of "killer" chiefly referred to in this article appear to be the *Orca ater* and *O. rectipinna* of Cope, though possibly a third species is figured. The same enterprising magazine has at former times furnished us with other articles of value from Capt. Scammon's ready pen, respecting other marine mammals of the Pacific Coast, among them valuable papers on the Sea Otter ("Overland Monthly," Vol. IV, Jan., 1870, pp. 25-30), and the sealions and seabears (*Ibid.*, Vol. VIII, Mar., 1872, pp. 266-23). We are glad to learn from Captain Scammon (incidentally in a letter to the writer) that he proposes soon to collect his various articles on the seals and whales of the Pacific and republish them in book form, accompanied with illustrations and much additional matter, — a work which his long familiarity with them eminently qualifies him to prepare, and which will be heartily welcomed by naturalists, as well doubtless as by the general public. — J. A. A.

How Plants Behave.* — Dr. Gray has just given us, under this title, a most charming continuation of his Botany for Young People, commenced in the well known volume, "How Plants Grow." Like that volume it gives a simple and well illustrated account of the phenomena of plant life, all the more to be enjoyed, because the author's scientific eminence guarantees its entire agreement with the last established facts and theories in Botany. The plan of the book is thus stated in the preface:

"There is a study of plants and flowers admirably adapted, while exciting a lively curiosity, to stimulate both observation and thought, to which I have long wished to introduce pupils of an early age. The time has now arrived in which I may make the attempt, and may ask young people to consider not only 'How

* Botany for Young People: Part II. How they move, climb, employ insects to work for them, etc. By Asa Gray. pp. 46. 12mo. with 40 illustrations. New York and Chicago. Ivison, Blakeman, Taylor, & Co. 1872.

Plants Grow,' but how plants Act, in certain important respects, easy to be observed,— everywhere open to observation, but (like other common things and common doings) very seldom seen or attended to. This little treatise, designed to open the way for the young student into this new, and, I trust, attractive field, may be regarded as a supplement to the now well-known book, the title of which is cited at the beginning of this prefatory note. If my expectations are fulfilled, it will add some very interesting chapters to the popular history of Plant-life.

"Although written with a view to elementary instruction, and therefore with all practical plainness, the subjects here presented are likely to be as novel, and perhaps as interesting, to older as to young readers.

"To those who may wish to pursue such studies further, and to those who notice how much is cut short or omitted (as, for instance, all reference to discoverers and sources of information), I may state that I expect to treat the subject in a different way, and probably with somewhat of scientific and historical fulness, in a new edition of a work intended for advanced students."

The book contains three chapters of unequal length. Of these, the first describes the motions of plants and how they climb. The third chapter takes up the very curious fact that certain plants, for the most part in their leaves, possess living and very efficient insect-traps. The Pitcher-plant and Sundew are figured and described. In naming the volume "How Plants Behave," Dr. Gray appears to recognize a personality in plants — at least he is careful, all the way through, to show that the actions which he explains are the result of the plant's will; and just as far as botanical science allows, he assigns the reasons for them. The following, from his account of the Venus' Flytrap of North Carolina shows the ambitious hunger which may make a plant carnivorous:

"It cannot be supposed that plants, like boys, catch flies for pastime or in objectless wantonness. Living beings though they are, they are not of a sufficiently high order for that. It is equally incredible that such an exquisite apparatus as this should be purposeless. And in the present case the evidence of the purpose and of the meaning of the strange action is wellnigh complete. The face of this living trap is thickly sprinkled with glands immersed in its texture, of elaborate structure under the microscope, but

large enough to be clearly discerned with a hand lens; these glands, soon after an insect is closed upon, give out a saliva-like liquid which moistens the insect, and in a short time (within a week or two) dissolves all its soft parts — digests them, we must believe; and the liquid, with the animal matter it has dissolved, is reabsorbed into the leaf! We are forced to conclude that, in addition to the ordinary faculties and function of a vegetable, this plant is really carnivorous."

But by far the most interesting part of the book is the second and longest chapter, which takes up the Fertilization of Plants by Insects. There are especially two things for which we have to thank Dr. Gray, besides the general charm of his writing upon this theme. He has given us the simplest and most comprehensive statement of this great subject which we have seen, and it is no small advantage to have the enthusiasm of a thorough student of Botany turned to the work of instructing others. But in addition, he has taken his illustrations largely from common flowers, such as the Houstonia, Kalmia, Arethusa, Iris, etc., and has figured each with great beauty and accuracy. He has a word upon each of the many peculiarities in the arrangement of their stamens and pistils which plants present, and shows that instead of being limited to any one family, as to the Orchids, the agency of insects is very largely employed by all families of plants. It is impossible to quote from this chapter where all is so interesting, unless we give a word or two of Dr. Gray's summary, where the flowers of an estimable theologian's poetry are themselves fertilized in the interest of Science:

"The reciprocity of flower and flower, and of insects and flowers, is something admirable. Insects pay liberal wages for the food which flowers provide for them. The familiar rhymes of Dr. Watts directed the attention of young people to the bee visiting the flower as a model of industry. With a slight change of a couplet, adapting it to our present knowledge and to the lesson of mutual helpfulness, we may read:—

> How doth the little busy bee
> Improve each shining hour,
> While gathering honey day by day,
> To fertilize each flower."

The paper, print, and illustrations of this little volume are especially good. The vignette title page is an excellent grouping of the various plants described within. — E. C. B.

Ornithological Works in Prospect. — The present year promises to be a marked one in the history of North American Ornithology, no less than four important works on the subject being already in press, and nearly all so well advanced that their publication will probably not be long delayed. First, in respect to time of appearance, will apparently be the "Key to North American Birds,* by Dr. Elliott Coues, a gentleman well and favorably known to the ornithological public through his admirable series of memoirs on various groups of our birds. The greater part of this work is already in type, and its publication, may be expected early in the coming autumn, the prospectus of the work having already been issued. Through the kindness of the publishers we have been favored with advance sheets of the portion printed, and can hence speak the more confidently of its character. The work is divided into three parts, — a general "Introduction," an analytical "Key" of the genera and subgenera, and a general "Synopsis" of the species. The *Introduction* gives a popular elementary exposition of the leading principles of ornithology, in which especial attention is paid to the description of the external parts and organs of birds, which are illustrated by appropriate figures. The definition of the technical terms in common use in ornithological writing is particularly full and clear, surpassing in this respect any similar treatise on the technicalites of the science with which we are acquainted. The *Key* forms a novel feature in zoölogical manuals, constituting an artificial analysis, in a continuous table, of the genera and subgenera, similar in character to the analytical keys that have been so successfully introduced into botanical manuals. In connection with the definitions of terms contained in the Introduction, the student is guided at once to the identification of any specimen of North American bird he may have, however slight his previous experience. It hence forms an invaluable feature of the work to collectors and amateurs. In the *Synopsis* that follows, the species are arranged in an approved systematic sequence, and are very fully and concisely described, all the characters which are really distinctive and essential being given without confusing the student with unimportant details. A large number of full length figures,

*Key to North American Birds: containing a concise account of every species of living and fossil bird at present known from the continent north of the Mexican and United States Boundary. Illustrated by 6 steel plates and upwards of 250 woodcuts. By Elliott Coues, Assistant Surgeon United States Army. Salem: Naturalists' Agency. 1872. Imperial 8vo, cloth.

and over two hundred figures illustrating the head as well as the feet and occasionally other parts, add greatly to the value of the work. The higher groups are also quite fully characterized, and in connection with their diagnoses much general matter of interest is presented. Although the work is not to any great extent biographical, the leading traits of the various groups and of most species are tersely presented, and the geographical distribution of each quite fully stated. The author makes a considerable reduction in the number of species that have hitherto been generally accepted, assigning a few to the list of synonymes, but by far the greater part of the reduction results from a judicious discrimination between species and geographical varieties, — a reform urgently demanded by the advance of science. By this means the rank and relationship of the different forms described is clearly expressed.

Another important feature of the work will be a synopsis of the fossil birds of North America, which will furnish the student with the first connected presentation of the subject that has been made, embracing a summary of the different disconnected descriptions of our fossil birds, which at present are to be found only in the original memoirs scattered through the proceedings and transactions of scientific societies.

The typographical appearance of the work is all that can be desired, and would be a credit to any publishing house. It is printed on toned paper, and illustrated by six steel plates and about two hundred and fifty woodcuts.

It is unquestionably destined to rank, as a text-book of North American Ornithology, as a work of equal importance, in its own province, with "Gray's Manual of Botany" and Packard's "Guide to the Study of Insects," in their respective fields, thus forming to the inexperienced student an invaluable guide, and a convenient work of reference to those more advanced; while its moderate cost places it within the reach of all. While its limits prevent a complete citation of previous authors, all our general works are cited, including the older works of Wilson, Nuttall and Audubon, and Baird's elaborate and indispensable general works, and numerous original papers in the publications of scientific societies.

The most complete work on North American Ornithology,* yet

* The Birds of North America. By Prof. Spencer F. Baird, with the coöperation of Dr. T. M. Brewer and Mr. Robert Ridgway. Little, Brown, and Co., Boston. 1872.

published or in prospect, is doubtless that recently announced by Messrs. Little, Brown and Co., of Boston. This will be an entirely original work, prepared by Professor S. F. Baird, Assistant Secretary of the Smithsonian Institution, with the coöperation of Dr. T. M. Brewer of Boston and Mr. Robert Ridgway of Illinois. The well known scientific attainments of these gentlemen will warrant the public in anticipating a thorough treatment of the subject, since their facilities are unequalled and their ability unquestionable. That such a work is at present greatly needed must be apparent to every one at all familiar with the subject, since our latest general treatise on the habits of the birds of this continent is that of Audubon, published nearly a third of a century ago, when the vast regions north of Canada and west of the Missouri River were almost a *terra incognita*, especially in respect to ornithology. Fourteen years have also passed since the publication of the last general work on the technical ornithology of this country, during which interval our knowledge of the subject has vastly increased. In addition to an exhaustive treatment of the technical portion of the science, the present work will contain full biographies of the species, including a large amount of original matter. As announced in the prospectus, the object of this work "is to give a complete account of the birds of the whole of North America, north of Mexico, arranged according to the most approved system of modern classification, and with descriptions which, while embodying whatever is necessary to the proper definition of the species and their varieties, in as simple language as possible, exclude all unnecessary technicalities and irrelevant matter." The work is said to be in an advanced stage of preparation, the first volume being promised by the 1st of December, to be followed by others during the winter, the whole to be comprised in a series of probably four volumes, the land birds perhaps occupying three; all the volumes will be profusely illustrated. The illustrations are to consist of a series of outlines of the wings, tail, bill and feet of each genus, with a series of full length figures of one species of each genus, in addition to a series of plates. The work is to be furnished in two editions, one plain and the other with the plates carefully colored by hand. The publishers feel justified in promising a work that in many respects will be as marked an advance beyond its predecessors as was that of Audubon; and that in typographical excellence and in the accuracy and

beauty of its illustrations it will surpass anything of the kind ever published in America or in Europe. From a careful examination of advance sheets of the greater part of the first volume we feel sure it will not disappoint the expectation thus awakened.

We are also promised the early appearance of a valuable original work on the birds of Florida,* by Mr. C. J. Maynard of which the prospectus was issued a short time since. This is announced to be published in twelve parts, and to contain original descriptions of two hundred and fifty species, with full biographical notices, and to be illustrated with five plates drawn and colored from nature. As Mr. Maynard has spent the greater part of three years in Florida, devoting himself exclusively to ornithological pursuits, and has visited all parts of the state, including the Keys and the Everglades, we are led to expect much valuable information, in respect to the birds of that little known region. While the biographical part is written in an animated, popular style, the technical details will render it a work of importance to the scientific student. It is to be issued of full quarto size, and judging from the sample pages, its typographical execution will be excellent.

A fourth work on North American Ornithology, now in press, is the Ornithological Report of Mr. Clarence King's exploration of the Fortieth Parallel, prepared by Mr. Robert Ridgway. This we understand will be shortly issued, in the same elegant style of execution that has characterized the previous volumes of this important survey of which it will form the sixth of the series. It covers a field hitherto scarcely explored, and Mr. Ridgway's three years of field work in the country between the Uintah Mts. and the Pacific Coast, leads us to expect, from the care and thoroughness that mark this author's previous works, a volume of extreme value to ornithological science.

At our request the author has kindly given us a summary of its contents. from which we learn that it will consist of, three parts,—the first to be introductory, the second biographical, while the third will consist of a monograph of the North American *Raptores*. The introductory part will embrace a list, of the species

* The Birds of Florida: containing Original Descriptions of upwards of Two Hundred and Fifty Species, with notes upon their habits, etc., by C. J. Maynard. With five plates drawn and colored from nature, by Helen S. Farley. Salem; Naturalists' Agency 1872. 12 pts. 4to.

of the adjoining provinces not met with during the Survey; a chapter on the "characteristic features of the Avifauna of the Great Basin," and on "the distribution of its local Avifaunæ." It will also treat of "geographical variation in color and proportions," of "hybridism" and of "certain so called 'individual' variations." Also a "systematic catalogue of the species obtained and observed during the progress of the survey" will be given, and a "comparison of the Avifauna of the Truckee Valley," in spring, summer and winter, with other matter of a similar character. The biographical section will contain an account of the habits, etc., of all the species observed (some 220 or more) with measurements of specimens and other notes. The Appendix, as previously stated, will be devoted to a monograph of the North American *Raptores*. This is a work that has engaged Mr. Ridgway's attention for several years, and in which we are promised a new classification of the *Falconidæ*, materially different from that and based almost wholly on osteological grounds. The generic and subgeneric characters will be illustrated by accurate outline figures, and the species of all the *Raptores* will be distinguished not only by full descriptions of all their known stages of plumage, but synoptically in tables, in which they will be compared with all their exotic allies.

The greater part of the work is said to be already in type, and we look forward to its publication with unusual interest.—J. A. A.

Prof. Snow's List of Kansas Birds.—For one, I wish to express, through the Naturalist, my obligations to Prof. Snow for his list of the Birds of Kansas, and to commend the principle upon which he has scrupulously acted — to mention no birds in regard to the occurrence of which in the state, he had not positive evidence. Such local lists, at least in my opinion, are only of value when thus made. I am glad to know that at least one compiler of a local list has been able to resist the besetting temptation to swell his catalogue by mere guess work, or by giving us a redundant list of birds that "probably will be" or "ought to be found" within the prescribed limits. So far as his list went, it was honest and reliable, and one that can be easily increased by addenda as occasion arises and the knowledge is given. But it has been my experience that the error of including species that never occur, is irretrievable. Swainson's warbler seems destined to figure forever as a bird of

Massachusetts with my name for the authority, and *Dendroica cærulea* and *Polioptila cærulea* are continually quoted for New England, without the slightest reason for so doing; and now that Prof. Snow has given us a reliable basis for an authentic list of the Birds of Kansas, I for one am not inclined to criticise that list because of species that escaped his knowledge, or because of a few misprinted asterisks, to mark as breeding in Kansas, birds that probably go farther north. We would only advise Prof. Snow when next he revises his list, to distinguish between the birds found in Kansas during the breeding season and those the nests of which have been positively found. This is often an important distinction, more so than would at first appear. Barren and unmated birds are occasionally found where they do not breed. —T. M. B.

In regard to the above, I wish to add a word or two. I agree with "T. M. B." that Prof. Snow has placed ornithologists under obligations by his "List of the Birds of Kansas," and especially since the additions he makes below, and the correction of typographical errors, etc., in the new edition I understand he is about to publish, will make it a correct exposition of the avian fauna of Kansas, as known at the present time. Professor Snow certainly avoided the "besetting temptation to swell his catalogue by mere guesswork" for through correspondence with him I have been gratified to learn that not a species was included except on good evidence, and that many of the apparent mistakes to which I called attention in the June number of the NATURALIST, in respect to species marked as breeding, were due to typographical errors. Having had considerable experience in the use of local lists, I may perhaps be pardoned for still persisting that if he had restricted his list to Eastern Kansas, or even to the birds actually observed in the vicinity of Lawrence, it would have been a far more useful contribution to geographical zoology. The fault of many lists, especially of those that are essentially merely nominal, is that they cover too much ground. Almost any of our larger states embrace portions of country very different in their climatic and faunal aspects, and it is hence quite insufficient to give merely the names of the species, without indicating whether they are accidental, occur only over limited areas, or uniformly over the whole area in question. My notice of Prof. Snow's paper being a conscientious review of its character as judged by its "internal evi-

dence,"— for I could not be expected to discriminate between typographical errors and those that were not,— I felt called upon to notice the omission of species that were among the most characteristic over half the area of the state; nor could I anticipate the speedy additions and emendations by which Prof. Snow's first brochure seems about to be transformed into as complete an exposition of the avian fauna of Kansas as our knowledge of the subject at present permits.

The above remarks are perhaps due to Prof. Snow; and it is likewise due to myself to state that if any unfairness of criticism or lack of appreciation on my part of the value of Prof. Snow's list is implied in the above remarks of "T. M. B.," I must beg leave to state that I fail to see the justness of any such implication.— J. A. A.

Since publishing my Catalogue of the Birds of Kansas, Mr. Allen's article in the May NATURALIST has appeared, containing 18 species not on my list, and he has also informed me of 4 others. Prof. Baird also has kindly gone through the Smithsonian collections and sent me 23 more species, represented there but not enumerated in my catalogue, and Mr. E. A. Popenoe of Topeka has added one other. This gives a total addition of 45 species, swelling the list to 284 *species* (or 282 *species*, if Nos. 9 and 10 and Nos. 12 and 13 are considered identical). The names contained in the following addenda* will be incorporated in a revised edition of the catalogue. — FRANK H. SNOW, *Lawrence, Kansas, May* 15.

* *Additions to the Catalogue of Birds of Kansas, communicated by J. A. Allen and S. F. Baird*:—3a. Hypotriorchis Richardsoni. Richardson's Merlin; Baird. 17a. Ictinia Mississippiensis, Mississippi Kite; Baird. 44a, Antrostomus Nuttallii. Poor-will; Allen, seen near Topeka. 45a, Chordeiles Henryi. Western Nighthawk; Allen, at Ft. Hays. 46a, Milvulus forficatus. Swallow-tail Flycatcher; Baird, seen at Ft. Riley. 60a. Turdus Pallasii. Hermit Thrush; Baird. 66a. Parula Americana. Blue Yellowback; Allen, near Leavenworth. 68a. Geothlypis Philadelphia; Allen. 70a, Helminthophaga pinus. Blue-winged Yellow Warbler; Allen. 70b, H. chrysoptera. Golden-winged Warbler; Baird. 70c, H. ruficapilla. Nashville Warbler; Allen, near Leavenworth. 74a, Seiurus Noveboracensis. Small-billed Water Thrush; Baird. 76a. Dendroica Blackburniæ. Allen. 76b. D. cærulea. Blue Warbler; Allen, near Leavenworth. 76d, D. cærulescens. Black throated Warbler; Baird. 76e. D. virens. Black-throated Green Warbler; Baird. 79a. Myiodioctes mitratus. Hooded Warbler; Allen, near Leavenworth. 81a*. Pyranga æstiva; Baird. 94a. Vireo Noveboracensis; Baird; Allen. 95a. V. solitarius; Baird. 103a, Troglodytes hyemalis. Winter Wren; Baird. 105a. Sitta Canadensis. Red-bellied Nuthatch; Baird. 118a. Plectrophanes pictus; Baird. 118b.* P. ornatus. Chestnut-collared Bunting; Allen, near Ft. Hayes. 118c, P. Maccownii. Maccown's Long-spur; Allen, at Ft. Hays. 118d, P. melanomus; Baird. 132a,* Spizella pallida. Clay-colored Bunting; Allen, near Topeka. 135a, Peucæa Cassinii. Allen, near Ft. Hays. 140a.* Guiraca melanocephala. Black-headed Grosbeak; Allen, at Ft. Hays. 164a.* Pediœcetes phasianellus. Sharp-tailed Grouse; Allen, north of Ft. Hays. 177a,* Ægialitis montanus.

BOTANY.

Botany Forty Years Ago. — In a Washington book-stall, was found not long since, a copy of a book, probably now becoming rare. "Floræ Columbianæ Prodromus Exhibens Enumerationem Plantarum quæ hactenus Exploratæ sunt: or A Prodromus of The Flora Columbiana, Exhibiting a List of All the Plants, which have as yet been Collected. Compiled by John A. Brereton, M.D., U.S.A., Washington. Printed by Jonathan Elliot, and sold at his store on Pennsylvania Avenue, 1830."

The preface states that in 1825, was formed "The Botanic Club," consisting of Wm. Mechlin, Wm. Rich, Alex. McWilliams, M.D., John A. Brereton, M.D., and James W. Robbins, M.D., having for its object "to explore and to investigate, *de novo*, the indigenous plants growing in the District of Columbia.

As the result of five years' exploration, this Prodromus is published, giving a list of four hundred and thirty-eight genera with nine hundred and nineteen species, a large number for one locality. But again quoting from the preface, "The erudite Botanist will be astonished to perceive the names of several plants, in this Prodromus, which he is well aware, belong to other localities; but when he considers the various and alpine sources of our majestic Potomac, on whose stream their rudiments are borne, and deposited along its bank, his astonishment will cease." The plants are arranged according to the Linnæan System, while in an appendix is given "An Exposition of the Natural System of Jussieu."

This little work gives a pleasant picture of scientific interest and zeal, so long ago, and carries us back to the early days of American Botany. In the list of authors, we find no mention of the name of Dr. Gray (to-day it would be like the play of Hamlet with the part of Hamlet left out), but instead, Clayton, Walter, Michaux,

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Mountain Plover; Allen, western Kansas. 178a. Æ. melodus, Piping Plover; Baird. 178b, Squatarola helvetica, Black-bellied Plover; Baird. 185a, Tringa Americana, Red-backed Sandpiper; Allen, near Leavenworth. 186.1, Actodromas Bairdii; Baird. 197a, Limosa Hudsonica; Baird. 198a, Numenius Hudsonicus; Baird. 198b. N. borealis, Esquimaux Curlew; Allen, a single specimen seen. 202a, Gallinula galeata; Baird. 207a, Bernicla Hutchinsii; Baird. 225a, Mergus serrator; Baird. 56a.* Empidonax acadicus, Green-crested Flycatcher; Allen, E. Kansas. 76e,* Dendroica discolor, Prairie Warbler; Allen, E. Kansas. 122a. Coturniculus Henslowii, Henslow's Bunting; Popenoe, Topeka. 201a, Porzana Jamaicensis, Little Black Rail, Allen, one specimen.

Rich, Pursh, Bigelow, Nuttall, Barton, Elliot, Torrey and Darlington, the latter of whom is spoken of as giving them his assistance, while a member of the House of Representatives.

Should such an example be imitated, and Natural History Societies spring up in every city or even village, not ambitiously seeking to accumulate large collections, but simply to make as complete as possible local collections of the fauna, flora, etc., of the vicinity, how many youthful naturalists might be trained, and what valuable additions might be made to our stock of knowledge respecting the inhabitants of our fields, woods and waters!

Another item of interest is found in this little book, "It would appear from recent observations, that some plants are *periodical* in their efflorescence; or from some unknown cause, disappear for several years at a time; for instance, *Orchis spectabilis* was found by members of the late Botanical Society, eight or ten years ago; and although the most diligent search has been made for it, for at least five years past, it has not been discovered until this season, when it is very abundant, and has been found in various parts of the District, by different individuals. I have also observed that *Arethusa bulbosa* is very abundant some years, and during others extremely rare. About five years since, *Batschia canescens*, was found in great abundance, near the Race-course, but has never been seen since."

The writer has had many similar experiences. In 1860, he found *Subularia aquatica*, growing very plentifully, on the muddy banks of a canal basin, near Portland, Me., but has never been able to find a trace of it since.

Cypripedium arietinum was found some years ago, in the vicinity of Portland, quite plentifully, by Dr. Wm. Wood. Several times during the next five years we visited the locality, but found not a plant, till 1869, when we gathered some twenty specimens.

Again, the writer botanized in the vicinity of Seneca Lake, in company with Prof. Wm. H. Brewer of Yale College, one or the other of us, going over the ground quite thoroughly for seven summers, and collecting over seven hundred species.

During these seven years, many species appeared, disappeared, and reappeared, without apparent cause, and without perceptible change in the climatic or other conditions. Among these, were *Ranunculus Purshii*, *Aplectrum hyemale*, *Orchis spectabilis*, *Pterospora andromedea*, and others not now remembered.

Probably every careful botanist would be able to relate similar experiences.— J. W. CHICKERING, JR. *Washington.*

MOOSEWOOD FIBRE.— At a recent meeting of the California Academy of Sciences, Dr. A. Kellogg presented specimens of the bark of a shrub *Dirca palustris* (Moosewood) of stronger fibre than any hitherto known, obtainable in this vicinity by tons and in the valley of the Mississippi by millions of tons.

The bark presented was in the crude condition as it came from the Ramie machine. The entire shrub, wood and bark, is suitable to work into fine quality of paper.

If desirable to separate the bark, it is done in the easiest manner possible. On the State University grounds may be seen a tree four and one-half to five inches in diameter. Mixed with silk the fibre is superior to Ramie. Even for coarse fabrics it may prove a substitute for jute, of which a very large amount is annually imported into the Southern States for baling cotton. The tree is familiar to us as Moosewood, but has not heretofore been brought forward, so far as we are aware, as material for paper.

OBIONE SUCKLEYANA TORREY.— In our Colorado collections last year we find this plant, perhaps the first time gathered so far north.— THOMAS MEEHAN.

BOTANICAL NOTABILIA.— E. A. Thompson of North Woburn announces a wild double-flowered state of *Saxifraga Virginiensis.* We have heard of this in only one instance before. Rev. N. Coleman finds at Grand Rapids, Michigan, a *Trillium grandiflorum* "with six sepals and fifteen petals, all green." This *chlorosis* monstrosity occurs occasionally, but we have never seen so many floral leaves. Also *Ranunculus Purshii* with leaves all dissected although the plants were strictly terrestrial, rooted in merely moist ground.

CORRECTION. — In my remarks, in the last number, on *Quercus alba* var. *Gunnisonii*, I wrote, " some of the trees have the bark of *Q. alba*," not *none* of the trees, as was printed. — THOS. MEEHAN.

ZOOLOGY.

THE GREGARIOUS RAT OF TEXAS (*Sigmodon Berlandierii*). — This is a burrowing, gregarious rat, and like the Prairie dog lives

in towns on the prairie. They dwell together in families. They prefer light sandy soil on the prairie, where the shivered limy sandstone crops out, but when the prairie is enclosed and cultivated, they take possession of the fencing, and burrowing under the bottom rail, excavate sufficient cells and construct their copious grassy beds there. Out on the prairie, in the wild state, they make one principal burrow, in front of which they pile up the earth that comes from all their subterranean galleries. They rarely extend their main burrow more than eight or nine inches in depth, while their underground passages are seldom more than four or five inches below the surface. They also construct several secret outlets, opening ten or twelve inches from the main hole, which opening they very ingeniously conceal by strewing a few grass blades over it; and so, when the rat hunter attacks the citadel the inmates escape through some of the concealed passages. Eight or nine inches deep and turned a little to one side in the main hole, is a cavity seven or eight inches in diameter, filled with fine, soft grass blades, which must be quite warm and pleasant, serving the family for winter quarters. During the hot months, they construct nice grass beds in a basinlike cavity, which they dig out, under the sides of large tufts of grass, or little heaps of brush. The above is about the average customs of the distinct families in reference to the manner of making their homes, and in the same district, in suitable soil, they construct many such family residences, and cut out very nice, clean roads from one to another in all directions. The grass, weeds, dewberry briers and everything in the way, are cut out and carried away leaving the road about two inches wide, underrunning the grass and other rank growths that may fall in the way. I have traced some of these roads fifty or sixty yards, upon which there had been so much labor expended that it could not have been the result of individual enterprise. These roads, which bear the indications of much travel, are evidently the results of a unanimous governmental effort. They are found universally in their cities, and passing from house to house there are many cross roads.

This Rat has a large thick head, nothing remarkable about the mouth and nose, eyes full, black and lustrous, ears half of an inch high and nearly circular; neck very short, body short and large; tail three and three-fourths inches long, clothed with very short, thick set hair; feet with five toes, nails strong. No cheek pouches;

no grooves about the incisors, not very long hairs or "smellers" on the nose. Coloration a brownish gray. — G. LINCECUM, *Long Point, Texas.— Communicated by the Smithsonian Institution.*

NOTES ON CEMIOSTOMA. — I desire to correct a statement made by Mr. Mann in the June number of the NATURALIST, p. 339, viz., that *Cemiostoma coffeellum* is "the only species of *Cemiostoma* which is known outside of the limits of Europe."

This is a mistake. In the "Transactions of the London Entomological Society," Ser. 2, Vol. v, pp. 21 and 27, and in Ser. 3, Vol. ii, p. 101, certainly two, and if my memory is not at fault, three species, are described from India, and in Vol. iii, p. 23, of the "Canadian Entomologist," I have described a species, as *C. albella*, which I had then found mining the leaves of poplar trees (*Populus alba*, *P. dilatata* and *P. monilifera*). Since then I have found it also mining the leaves of willows (*Salix alba* and *S. Babylonica*). It resembles *C. susinella* very closely and as *Susinella* mines the leaves of *P. tremuloides* in Europe, I shall not be surprised if it proves to be that species. It would be difficult, if not impossible, now to ascertain the original food plant of *C. susinella* (if *albella* is identical with it). But it would not be very surprising if it fed on the weeping willow, and has followed its migrations from a time perhaps anterior to that when the Hebrews hung their harps upon the willows by the rivers of Babylon.

If therefore *C. albella* is only a synonyme of *C. susinella*, it is a European or Asiatic species. And judging from the food plant, *C. coffeellum* is also an Asiatic (or African?) species. It would thus seem that we have as yet no indigenous species of *Cemiostoma*.

Mr. Stainton, Dr. Clemens and others, mention a "spring brood," a "fall brood," etc., of *Microlepidoptera*. At page 184 of Vol. iii, Can. Ent., I have stated as the result of my observations that the *Lithocalletidæ* (in which family I would include *Lithocalletis*, *Leucanthiza*, *Philocnistis*, *Cemiostoma*, *Tischeria*, and perhaps *Lyonetia*) continue to propagate their species as long as the weather remains warm enough: so that the number of generations in a year is (subject to the length of time passed by each species as larva, pupa and imago) a mere question of climate, and that the different generations overlap each other so that there is no such thing as separating them into distinct broods. This is likewise true of some species of *Gracillaria*. I do not know how it is

as to *Lyonetia* of which we have but one species described by Dr. Clemens from a single captured imago. But I am glad to see that Mr. Mann's observations as to the number of broods of *C. coffeellum*, confirm mine as to the *Lithocalletidæ* generally.

Mr. Mann writes the termination of the specific names of the *Tineina*, *ellum* instead of *ella*. As a matter of grammatical purity this may be well enough, but the termination *ella* has been so universally adopted, and in use so long that it is too late now to change it, and as a matter of convenience it had better be retained. —V. T. C., *Covington, Ky.*

THE RATTLE OF THE RATTLESNAKE.—Being interested in the controversy now in progress in the pages of the NATURALIST relative to the use of the caudal appendage of the rattlesnake, and knowing that all the facts concerning it must be duly considered before any definite conclusion can be arrived at, I have presumed to proffer my mite and suggest some inquiries, the consideration of which may throw some light on the subject.

All movements of the animal are accompanied by the peculiar sound; at least, such is my observation and I have had ample opportunities for observing. The more forcible or vigorous the movement the louder the rattle. When moving through tall stiff grass the sound emitted is much louder than when the movements are not so retarded. This peculiarity I noticed two years ago when on the frontier in this state. One day while sitting in the door of my tent, a large rattlesnake appeared on the *tramped ground* in front. He seemed to be moving "leisurely" across, his movements being attended with a "gentle" rattle. After watching him about two-thirds the way across the tramped ground, I started toward him, when he increased his speed and the rattling sound correspondingly increased in frequency and character.

Inquiry A. Is the rattling produced by vital or mechanical means? The increased rattling when the movements are retarded would seem to indicate the latter. The rattle of the dead animal when moved, emits the same peculiar sound, or shaking the rattle in the closed hand is attended with a like result, the sound being somewhat muffled in character, dependent upon being conveyed through the hand. The greater the number of segments in the rattle the greater the sound; the larger ones emitting the louder sound but being of a lesser pitch than the smaller ones.

Inquiry B. Does the fact of the increase of the number of segments with the age of the animal militate or substantiate the theory of "Natural Selection" as applied to the phenomena? The older the animal the louder the rattle. It seems to me that this fact tends to disprove the mimetic claim of Prof. Shaler and the "self-protective" feature of Mr. Henderson. Both of these features, Mimicry and Protection, may be included, but neither, nor both combined, will account for the whole of the phenomena, in relation to this fact — the young requiring greater facilities for obtaining food and more extensive measures for protection. — T. W. DEERING, *Leavenworth, Kansas.*

VENOMOUS FISH. — It is generally known that the wounds inflicted by the weevers (*Trachinus*) of our coasts, and by the sting-rays, are rendered poisonous by a mucous excretion adhering to the spines of the head, back, and tail of these fishes; and a most perfect poison-organ, analogous to the poison-fang of snakes, was described some years ago by Dr. Günther in two fishes (*Thalassophryne*) from Central America. Dr. Le Juge has found at the Mauritius another still more dangerous kind of venomous fish; it was long known to ichthyologists under the name of *Synanceia verrucosa*, and is readily recognized by its monstrous appearance, the head being deeply pitted, and the body scaleless and covered with warts. It is by no means scarce, being found throughout the Indian Ocean, and known at the Mauritius as the "Laffe." There are thirteen spines in the dorsal fin, each provided at its base with a bag containing the poison, and with a pair of deep grooves along which the poison is guided to the wound. As in all the other fishes of this kind, the poison-apparatus is merely a weapon of defence, and comes into action when the fish is seized or trodden upon. The action of fish-poison upon the human organism appears to be less rapid than that of snakes; though patients who neglect to apply remedies similar to those used for snake-bites expose themselves to serious consequences, which may terminate even fatally. In one case a fisherman died on the third day from a severe wound. Dr. Le Juge mentions that the fishermen of Mauritius successfully apply poultices of the leaves of a composite plant, *Microrhynchus sarmentosus*. (*Transact. R. Soc. of Arts and Sciences of Mauritius*, 1871.) — *Academy.*

VITALITY OF REPTILES. — I wish to draw your attention to some experiments by the Rev. William Buckland, as well on account of

their interest as to prevent their needless repetition. I do not recollect where I found the account of them, but I give the substance from memory. Twelve frogs were carefully weighed and placed in holes drilled in limestone, and the holes were covered with glass lids, cemented with clay, and the glass protected by slate, also cemented with clay. Twelve were treated in the same way in a block of compact sandstone, and another lot were placed in holes drilled in the trunks of trees. At the end of a year they were examined. Those in the wood were dead and partly decayed, as were those in the sandstone. About half of those in limestone were living and of these all but two had lost weight; and two had increased in weight. The cement closing the cell of one of these was cracked so that small insects may have found their way into it, and served as food; and although no crack could be found in the cell of the second it was probably fed in the same way, as in a third cell, also without any discoverable crack, in which the frog was dead, several small insects were found. The living frogs were closed up again, and at the end of the second year, all were dead. The frogs were examined frequently, during their confinement, by removing the slate without disturbing the glass, and in all cases the living ones were found not torpid, but awake and active. —W. K. Brooks, *Suspension Bridge, N. Y.*

Change of Temperature in Water Containing Recently Fertilized Shad Eggs.—In the September number of the Naturalist, 1871, the question was asked, "Can any one give us an explanation of the *fact* " that, as reported by A. S. Collins, when shad eggs swell after impregnation, the water in the pan becomes about 10° colder?" Such a fact requires, of course, careful and repeated observation to establish it. But, in connection with it, the following (from "Nature," January 18, 1872) has some interest. At the Academy of Sciences, Paris, January 2d, "a note on the heat absorbed during incubation, by M. A. Moitessier, was communicated by M. Balard. The author finds that the specific heat of fecundated is less than that of unfecundated eggs when treated in the same manner, and infers that a portion of the heat absorbed by the former during incubation is transformed."

According to the recognized use of the term "specific heat," it is obvious that this statement should have been, that the specific heat of fecundated eggs is *greater* than that of unfecundated ones; as heat is said to be *absorbed* by the former. The trans-

formation, however, which is referred to, is exactly what occurred, to the mind of the writer, upon reading the item concerning shad eggs; but he was diffident about expressing it, until meeting with the above confirmation, both of the fact and of the explanation. There are few cases more satisfactory, in favor of the correlation between life-force (growth-force, bioplastic force) and the other physical forces, than heat. — H. HARTSHORNE, *Philadelphia*.

ANOTHER NOTE ON THE SAME.—My idea is that germination in the seed of plants requires heat, so does the impregnation of the eggs named. Hence the absorption, so to speak, of the heat from the water. We all know that conception in the animal requires heat, making the conclusion above obvious. — N. COLEMAN, *Otsego, Michigan*.

NEST AND EGGS OF HELMINTHOPHAGA LUCIÆ. — This interesting little bird was discovered in Arizona, and first described, by Dr. Cooper (Proc. Cal. Acad. 1862, 11, 120) and afterward written about by the same gentleman (B. of Cal. 84), by Baird (Rev. 178) and by ourselves (Ibis, 1866, 260; Proc. Phila. Acad. 1866, 70); this is its record, up to date, the nest and eggs remaining unknown. Lieut. Charles Bendire, U.S.A., writing to us from his camp near Tucson, Arizona, May 19, 1872, says: "I found to-day the nest of a very small warbler, four inches long, which has a bright chestnut spot on the crown, and the tail coverts of the same color, the other upper parts cinereous, the lower parts dull white. I cannot find it in Baird's work. The eggs, four in number, are nearly globular in shape, and hardly larger than those of a hummingbird, white, with fine red spots on the larger end. I am afraid I shall be unable to save them, as they contain large embryos. The nest was placed between the bark and main wood of a dead mezquite tree, about four feet from the ground." — ELLIOTT COUES.

OCCURRENCE OF COUCH'S FLYCATCHER IN THE UNITED STATES. The same valued correspondent speaks of finding this bird near Tucson; it has not, I believe, been hitherto taken north of Mexico. It is a slight northerly variety of the *Tyrannus melancholicus*, a species of wide distribution in Central and South America. — ELLIOTT COUES.

THE FOOD OF THE BLACK BEAR. — A few days ago I secured

for the museum of this college a fine specimen of the Black Bear (*Ursus Americanus*) caught in the neighboring town of Pownal, Vermont. In his stomach there was not, apparently, a particle of animal food, but that organ was well filled with vegetable substances, the stalks and corms of the Indian Turnip (*Arisæma triphyllum*) being among the most abundant. The bear was very fat, but whether his excellent condition was brought about wholly by vegetable food is not known. — SANBORN TENNEY, *Williams College*, *June* 12, 1872.

A NEW LOCALITY FOR *Zonites cellarius* Müller. Living specimens of this imported species were received by me, last fall, from Mr. Samuel Powel, of Newport, R. I. They were found by Mr. David Coggeshall in his cellar. As is well known, the species has already been detected in almost every seaport, from New York to Halifax. — W. G. BINNEY.

THE BLIND CRAYFISH. — In the last number of the NATURALIST, p. 410, Prof. Cope proposes the genus Orconectes for the *Cambarus pellucidus* of the Mammoth Cave and his supposed new species from the Wyandotte Cave, "on account of the absence of visual organs," and states that "Dr. Hagen's view [in regarding the species as a Cambarus] may be the result of the objections which formerly prevailed against distinguishing either species or genera whose characters might be suspected of having been derived from others by modification, or assumed in descent. The prevailing views in favor of evolution will remove this objection."

My objection to the separation of *Cambarus pellucidus* from the other species of the genus simply because the eyes were rudimentary, was based on the fact that there are known cave insects, as for instance the genus *Machaerites* with seven species, in which the *females are blind*, while the *males have well developed eyes*. I did not mention the fact in my monograph because its discovery was nearly ten years old, often mentioned and well known by those who have studied the cave insects.

Would Prof. Cope have the cruelty to separate husband and wife so far as to put them in different genera because one of them is blind and the other not? If the prevailing views in favor of evolution demand such a separation, would it not be more human, and perhaps more courteous to the feminine sex, to wait a little while until the poor males shall be able to follow their more

advanced wives? It is rather hard for Nature to follow, or even compete, with the fast driving of the evolutionary disciples, but as she is after all a very good natured old lady I have no doubt she will do her best not to stay too far behind the prevailing views of evolution.

Concerning the new species, "*O. inermis*," the description of the single specimen does not give any character by which to separate it from the old species, *C. pellucidus*. I have not seen Prof. Cope's type, and, though he states that his specimen is a male, he omits to inform us to which of the two forms of males it belongs, but his description applies perhaps to the second form of the male, the characters of which are always less marked than in the first.— Dr. H. Hagen.

GEOLOGY.

New and Remarkable Fossils.— We copy from the "College Courant" the following summary of the latest published results of Prof. Marsh's expeditions to the West;—The extensive collection of fossil vertebrate remains which were made in the West by the Yale expeditions of 1870 and 1871, are yielding, in the hands of Professor Marsh, results of the greatest value to palæontological science. Ten important papers upon the new material thus obtained have already been contributed by "this indefatigable palæontologist" to the "American Journal of Science," the last three of which relate exclusively to the collections of 1871. The first of these later papers, published in April, contains a description of some Pterosaurian remains, additional to those discovered by the expedition of 1870, of which an account was published about a year ago. To the gigantic species of pterodactyl then obtained, Professor Marsh gave the name *Pterodactylus occidentalis*. The expedition of 1871, in exploring the original locality in Western Kansas, not only obtained further portions of the same skeleton, but secured other specimens which prove the existence of two other gigantic pterodactyls during the later Cretaceous. The characters of *Pterodactylus occidentalis* are derived from the study of portions of five individuals. They show clearly that the species belongs to the short-tailed or true Pterodactyls, and that it contains some of the largest "flying dragons" yet discovered, the spread of wing in these individuals

being from eighteen to twenty feet! Its large tearing teeth clearly indicate the carnivorous and predaceous habits of the species, and its food was doubtless fishes which it captured, probably by plunging into the water like the pelicans and other similar birds. Two new species, *P. ingens* and *P. velox*, are also described in the same paper. The former was even more gigantic than the one just mentioned, being at least double its bulk and measuring from tip to tip of the expanded wings fully twenty-two feet! *P. velox* was about two-thirds this size, having a spread of wing of from twelve to fifteen feet. The great interest attaching to these fossils lies in the fact that, up to the time of their discovery, no remains of these flying Saurians had been detected in this country, although they are found abundantly in the Cretaceous of Europe.

In the same number, Professor Marsh announces that the Mosasauroid reptiles were protected by osseous dermal plates. Specimens belonging to the genera *Edestosaurus*, *Liodon*, *Holcodus* and *Clidastes* have been obtained with these plates attached. These dermal "scutes," as they are termed, are quadrilateral in form, with the margin of the upper side more or less bevelled, so as to admit an imbricate arrangement; alternate rows of different sizes and shapes thus producing a complex pattern. The cranium was probably not thus protected.

In the May "Journal of Science" Professor Marsh describes the remarkable gigantic swimming bird, discovered in Western Kansas, to which he gives the name *Hesperornis regalis*. The skeletons of five individuals of this species, more or less complete, were obtained. From these, it appears that while Hesperornis differs widely from all known birds, recent or extinct, it has its nearest living allies in the Colymbidæ, or divers. The skeleton complete, would measure about five feet nine inches from the apex of the bill to the extremity of the toes. The extreme rarity of birds in the Cretaceous formation, even of any kind, renders this discovery of great importance. But it is especially so, when it is remembered that all the birds hitherto discovered, either in the Cretaceous of this country or of Europe, are of comparatively small size, and belong to still existing families; such as the swan-like bird (*Laornis*), the wading birds (*Paleotringa*), the rails (*Telmatornis*), and the cormorants, (*Graculavus*), which Professor Marsh has already described from the American Cretaceous.

But the most valuable of Professor Marsh's papers is the last, which appears in the "Journal of Science" for June. It is a review of the "Structure of the Skull and Limbs in Mosasauroid reptiles," made possible only by the richness of the Yale Museum in the remains of these remarkable animals. Though this paper is almost entirely a technical one, yet the results are obviously of high scientific interest. Prof. Marsh shows that the quadrate bone of the skull as given by Professor Cope should be reversed, by finding a skull of *Lestosaurus* with this bone in position. Moreover, his explorations have discovered the stapes, the columella, the quadratoparietal arch, the malar arch and the pterotic bone, belonging to the cranium; and have proved the exact character of the anterior limbs and the presence of posterior limbs in these reptiles. They also show that the neck in the Mosasaurus group was unusually short. Two new genera, *Lestosaurus* and *Rhinosaurus*, are described; under the former, four new species are included. *Rhinosaurus micromus* Marsh and *Edestosaurus rex* Marsh, are also here described. The paper is illustrated by four admirable lithographic plates.

MICROSCOPY.

Cells for Mounting Objects.—A recent discussion on this subject at the Queckett Microscopical Club in London, developed several important suggestions.

Lead cells. Mr. James Smith introduced the subject by a paper "On Cell Mounting." He used cells of sheet lead; flattening the sheet on a plate of glass by rubbing with an ivory paper knife, and cutting or punching cells which were subsequently flattened by pressure between two ordinary glass slides. Dr. Matthews suggested flattening the lead upon a plate of glass, by rolling, and cross rolling, with a piece of barometer tube. The Chairman, Henry Lee, Esq., remarked that Dr. Bowerbank had for years used exclusively tea lead for his smaller cells and common plumbers' lead for his larger cells: all his large collection of sponges were successfully mounted in this way. The secretary, Mr. T. C. White, had been in the habit for many years of using cells of thin sheets known as "pattern lead" used by dentists; the cells being easily stuck on with marine glue, and not melting if the slide should be made nearly red-hot.

Tin cells. Mr. Richards had used cells of rather thin tin foil, cut out with two punches with a piece of tube between to keep them the right distance apart: these cells were fastened on by a solution of glue and treacle dried on and then moistened enough to stick them, the cells being so thin that any liquid cement would have run in. The chairman commended the tin cells introduced by Mr. Suffolk; he having used them, fastening them on with marine glue with great satisfaction: Dr. Matthews, however, objected to them because they melt so easily if the slide be overheated.

Zinc cells and *vulcanite cells* were favorably mentioned by Mr. White, the former bearing great heat without melting, and the latter resisting the action of acids: but Mr. McIntire found they had a tendency to chip off.

[The expensiveness of glass cells, when used in large quantities, is the continual occasion of a demand for some good substitute. Tin cells are largely used in this country, being often fastened on by gold size whose only fault is that it dries so slowly that the cells require to be fastened on long before using, or with dammar varnish or Bell's cement. Doubtless the lead cells will hereafter be used by many who desire to preserve a great many specimens but cannot afford to spend unnecessarily on an elegant mounting. It would seem that some of the dealers might prepare and sell them at a price that would be remunerative to themselves, and at the same time an accommodation to buyers.]

The Common Paraboloid as an Immersion Instrument.—Notwithstanding the introduction into use of special contrivances as immersion paraboloids, it may not have occurred to all who use the microscope that the ordinary form of parabolic illuminator is capable of being used wet with excellent results. Placing the microscope in a vertical position, and greasing the rod in the centre of the paraboloid to keep the water from running out by the side of it, the cup of the paraboloid is filled with water heaped up as far as can be without running over, and then brought up until the water comes in contact with the under surface of the slide. The direction of the rays leaving the paraboloid is not altered by this arrangement, but dispersion at two surfaces is avoided and the rays enter the object slide without the usual refraction and at such an angle as to suffer total internal reflection before reaching

the objective. With the highest objectives generally used with black ground illumination, as a $\frac{1}{4}$th of 75° to 110°, the object seems no brighter than usual, but the field is free from the foggy diffuse light, otherwise present, and the object appears, beautifully distinct, upon a jet black ground. Even a $\frac{1}{5}$th or $\frac{1}{8}$th of 130° gives the same effect of a deep black background, and shows the object with good stereoscopic effect in Wenham's binocular. With objectives of 170°, the main effect is that of a dark background, though not so perfect as with the lower angles.—T. D. B.

Bichromatic Vision.—Mr. J. W. Stephenson, inventor of the recent binocular microscope which bears his name, has noticed that if different colors are presented, simultaneously, to the two eyes, the sensation produced will be that of neither of the two colors, but of one which would be produced by mixing them together. If the colors presented are strictly complementary, the effect will be that of common white light; as the two bright colored disks produced in the field of a microscope by a double image prism and a selenite plate, become white where they overlap. The effect is best studied with the binocular microscope and polariscope. A plate of selenite is introduced so as to give both fields of a bright conspicuous color; and then a film of mica is interposed in the course of the rays supplying one tube, of such thickness and position as to give, by retardation, a color as nearly as possible complementary to the first. One field, for instance, may be a bright red, and the other a bright green, while the observer, viewing both at once, will see only a colorless field. By an ingenious changing of the plates by which the colors are produced, both fields may be gradually changed to totally different colors, the complementary character being maintained throughout the change, without any knowledge of the change on the part of the observer. If the color of one field is entirely removed, the observer becomes slowly and feebly conscious of the color of the other. The optical and physiological bearings of this discovery are obvious and interesting.

New Arrangement of Spring Clips.—Miller Bros., of 1223 Broadway, N. Y., are manufacturing a contrivance which must be, for certain purposes, a very convenient substitute for Dr. Maddox's spring clips. It consists essentially of a mahogany strip, of suitable size, grooved upon its upper surface and protected with

pins in such manner that a dozen slides can lie, side by side, securely upon it. An equal number of thin brass wires spring from one side of the block, and are bent down so that they can be easily made to press upon the centres of the covers, to hold them in position while the balsam or other mounting material is hardening. Little cork disks are furnished to place upon the covers and beneath the springs. For some uses the corks would doubtless be dispensed with, and when needed they would probably be more convenient if attached to the wires by passing the wires through them. An additional groove should be cut in the wood under one end of the glass slides to facilitate the removal of one slide without disturbing the others.

Single Front Objectives.—Mr. Wenham believes that the principal use of the late discussion upon the working angular aperture of immersion objectives viewing balsam-mounted objects, which angle he still maintains is necessarily limited to 82°, although Mr. Tolles cannot see the difficulty of its exceeding that figure, consists in the dissemination of the information that the best American objectives, both dry and immersion, are now made with single fronts. As the originator of this style of construction, though having at the time no knowledge of its importance nor expectation of the success it has since attained, he naturally feels an undisguised interest in its success. The triple-front objectives he considers already obsolete.

Microscopy at the American Medical Association.—During the Philadelphia meeting of this society, this summer, an evening reception was given at the Academy of Natural Sciences, at which music and sociability were supplemented by the entertainment afforded by microscopic specimens. One hundred microscopes were used, and novel accessories exhibited.

Structure of Diatoms.—Prof. Adolf Weiss, of Lemberg, has published some researches upon this well-studied but still obscure subject. He regards the silicious envelope as capable of polarizing light, and as consisting of a cellulose coat more or less infiltrated with silex. He does not consider the individuals one-celled, but finds the valves composed of cells from .008 to .00025 mm. in diameter. These cells are furnished at their centres with papillæ which appear as striæ under low powers and as moniliform mark-

ings under high powers. The large cavity between the frustules is regarded as equivalent to the embryo-sac of higher plants, and the formation of new individuals has been observed within it. An alternation of generation is indicated by the observations made.

ORIGIN OF CANCEROUS DEPOSITS.— Dr. J. J. Woodward discusses this question in a report to the Surgeon General. His observations of structure do not differ materially from those of other recent observers, though the cell walls of the cancer cylinders, described by Kœster, he is able to detect in only a portion of the cases. He reviews the theory of Kœster who regards the nucleated cylinders as transformed lymphatics, and of Thiersch who explains them as outgrowths from the lower layer of the epidermis and from the epithelium of the glandular apparatus. The latter view was originally applied to epithelial cancer, but has been extended by Billroth to cancer generally. Dr. Woodward is manifestly unwilling to commit himself to any theory, but rather favors Kœster's on account of the well known similarity of the morbid growths when affecting different organs, and on account of the manner in which the cell cylinders anastomose, which points rather to the lymphatics than to the gland tissue. He seems not unwilling to regard the cancer cylinders as consisting of transformed white corpuscles accumulated in the lymphatic passages. The presence or absence of a cell wall he justly considers unimportant, it being only an indication of age in cells which, according to our present knowledge, consist originally of only a nucleus embedded in a mass of protoplasm.

THE "NERVE" OF THE TOOTH.— Mr. T. C. White has read a very interesting paper on this subject before the Queckett Microscopical Club. Though considering it a painful subject, and not to be touched upon except very lightly, he nevertheless considers it interesting to know something of its structure and uses.

The pulp, or so called nerve of a tooth, should be obtained from a tooth of the temporary set removed in a state of health to make room for the advancing permanent set. A longitudinal groove is to be filed around the tooth, which is then to be very carefully washed, and then split with a pair of wire nippers. The pulp will thus be fully exposed, and may be stained by soaking for twenty-four hours in an ammoniacal carmine solution as recom-

mended by Mr. Beale, washed, soaked in glycerine for a few hours, and finally flattened by gentle pressure in a compressorium for a few hours more until it is sufficiently thin to be examined by a $\frac{1}{4}$th inch objective. It is also advised to soak an entire tooth for a few weeks in the carmine staining fluid, then decalcify it by immersion in hydrochloric acid, and cut thin slices through the whole which will show the pulp and decalcified osseous tissue in their natural relation to each other.

Thus studied, the "nerve" appears to be a mass of areolar or connective tissue, through which ramify the nerve, vein, and artery. It not only constitutes a very delicate sensory organ, but originally was the means of building up the dentine; and even in adult life performs an important part in sustaining the vitality of the tooth, and is capable under certain stimulating influences of developing dentine again. [The unsatisfactory nature of a tooth whose "nerve" has been "killed" would seem to be confirmed and explained by these views of its functions.]

Misnaming Objectives.—[Although the controversial part of this question has occupied too much time already, we publish the following note from Mr. Stodder who seems entitled to an opportunity to correct the idea that his having previously written over initials implied an unwillingness to assume full responsibility for his statement. The editors of this Journal are not responsible for anything credited either by name or initials to any other authority.—Eds.] The brief remarks of mine, printed over the initials C. S. in the March number of this Journal, were copied essentially in the "Monthly Microscopical Journal" for April. In the May number of that periodical Mr. Wenham writes a reply. It is a remarkable paper not only from the eminence of the writer, as an authority on microscopy, but from his evident loss of temper and by the terms to which he refers to Mr. Bicknell and to C. S. Under these circumstances I must ask for a little space for a rejoinder to my share; I have nothing to say for Mr. Bicknell as he is able to take care of himself.

Mr. Wenham commences his paper which *he calls* a "reply" with this,—"to correct a misstatement that I [Mr. W.] wrote a paper in reply to one of Mr. Bicknell's; I did not commit myself to such an extent." This is a mere quibble, unworthy of its author. The very caption of the paper had Mr. Bicknell's name

in it. I should not have noticed this, had not Mr. W. unfairly, as I think, charged me with a misstatement.

Next, Mr. Wenham couples C. S. and Mr. Bicknell together as if they acted in concert, and were joint writers. I can assure Mr. Wenham that it is not so. Mr. B. is not responsible for any thing I have written, nor am I for him. Neither had seen the other's writing until it was public.

Next, I have no "plea or atonement" to make "for expressions hastily or inconsiderately written." My expressions were used deliberately and after full consideration of their import. I still hold the same opinion, namely, that selling an objective by a name that does not *approximately* indicate its focus (*i. e.* $\frac{1}{5}$ for $\frac{1}{4}$, $\frac{1}{25}$ for $\frac{1}{16}$ or, as I have known, $\frac{1}{25}$ for $\frac{1}{40}$, as in the case of an eminent French maker; or, as in another instance, a $\frac{1}{18}$ for a $\frac{1}{30}$; or, as in the case of an English objective that I have recently heard of, a $\frac{1}{25}$ for a $\frac{1}{8}$) is an "imposition," or a fraud if that term is preferred, not applying it, however, as Mr. Wenham represents, to a particular firm, but to all, of any country, who practise such "imposition;" and that Mr. Wenham in his paper, by stating that "$\frac{1}{8}$ths were $\frac{1}{8}$ths or $\frac{1}{10}$ths, and some now approach $\frac{1}{12}$ths in power," without disapproval, was practically defending the custom, and *that* he does not now deny. His paper in reply to Mr. Bicknell was published in December. In May he writes, "no one knows better than myself the difficulty of adopting a nomenclature that shall exactly denote the power of all the highest object glasses sent out"—something has evidently produced some effect on him since that time. The complaint was not of want of "exactness," but of gross misnamers of twenty or fifty per cent., such as he named in the December paper, not in regard to the highest powers alone but applicable to the lowest powers as well. Such was what I called an imposition, and I call it so now.

In the "Quarterly Journal of Microscopical Science," October 1862, Capt. Mitchell gives the measurement of the focus of several London objectives; most of them being undernamed. Capt. M. complains of this; he says "when I buy a $\frac{1}{4}$th, I want a $\frac{1}{4}$th, not something else." He calls those correctly named, *honest;* by implication, those not so named, dishonest.

Dr. Wm. B. Carpenter ("The Microscope," fourth ed., 1868, p. 184) says, "the designations given by the opticians to their objectives are often far from representing their focal length, as estimated by that of single lenses of equivalent magnifying power, a

temptation to *underrate* them being afforded by the consideration that if an objective of a certain focus will show a test object as well as another of higher focus, the former is to be preferred. Thus it happens that what are sold as $\frac{1}{2}$ inch objectives are often more nearly $\frac{4}{10}$, and that what are sold as $\frac{1}{4}$ are not unfrequently more nearly $\frac{1}{5}$." I presume that I am justified in assuming that Mr. Wenham was fully aware of both the above, that Capt. Mitchell termed the custom dishonest in 1862, and Dr. Carpenter that it was the result of "temptation" in 1868, yet he did not feel called on to "practically defend" the want of honesty, or the yielding to temptation. Was he not then as now "a witness in behalf" of those *he* calls the "most respectable portion of the body?" Was it only censure from this side of the Atlantic that was "worth caring for?" It certainly looks so.

For some twenty years I have watched Mr. Wenham's contributions to microscopy. I have used and admired his ingenious inventions and appliances and have looked upon him as one of the foremost leaders and authorities in the mechanical and theoretic departments of the science. It was with regret that I saw that he did not disapprove of the fictitious nomenclature. It is with greater regret that I find that he has in his haste used the arrogant expressions that he has.

The question of nomenclature is now being agitated, the attention of microscopists is attracted to it, and one consequence will be that the "honest" makers will be appreciated.— CHARLES STODDER, *Boston, May 27th.*

NOMENCLATURE OF OBJECTIVES. — Dr. J. J. Woodward's paper on this subject in the June number of the "American Journal of Science and Arts," goes over a considerable part of the same ground as Dr. Ward's paper published in the NATURALIST three months before; though that paper had not been read by Dr. Woodward at the time of writing the principal part of his article. Both authors are laboring for the same result, uniformity, though with some important minor differences of which we shall speak at another time. Both have proposed the naming of objectives by their amplifying powers; but it is greatly to be desired that no one shall adopt such a plan until some distance of measurement can be agreed upon by all. We have enough individual differences to reconcile already.

NOTES.

A MEETING of the Chicago Academy of Sciences was held on June 11th, in honor of the memory of its late Trustee, Director of its Museum, and Secretary, Dr. William Stimpson. A sketch of the life of Dr. Stimpson was given by President Foster. Letters were read from Prof. Joseph Henry, Mr. George C. Walker and others, and remarks were made by members of the Academy, bearing witness to the great and faithful labors of Dr. Stimpson in the cause of science and in the work of the Academy. Mr. E. W. Blatchford offered a series of resolutions in honor of the memory of Dr. Stimpson and providing for the publication, in the Transactions of the Academy, of a Memoir on his life, and the entering of the following tablet on the records:

IN MEMORIAM

WILLIAM STIMPSON, M.D.,

BORN FEBRUARY 14TH, 1832;

DIED MAY 26TH, 1872.

At a meeting of the Essex Institute held on June 12th, President Wheatland alluded to the death of Dr. Stimpson and called attention to the fact that his first experience in dredging, in which department of investigation he afterwards became so noted, was at a field meeting of the Essex Institute, of which he was a member. Mr. Putnam remarked on the great loss which science had met with in the death of Dr. Stimpson, and on his suggestion a committee was appointed to express, by a series of resolutions, the loss which the Institute experienced by the decease of its late member.

WE abstract the following notice of Major Lyon from the "Louisville Courier Journal" of June 25th:—

"Sidney S. Lyon, one of the most noted geologists in the West, died at his residence in Jeffersonville, Ohio, yesterday of paralysis, the result of wounds received during the late war.

Major Lyon was born in Cincinnati in the year 1807. He came to Louisville while a young man and supported himself for a time by portrait painting. Naturally of a studious disposition, and having an original mind, he became interested in the study of civil engineering. With the advantages of very little if any education at school, he applied himself at home and soon obtained a remarkable proficiency in the science; so great, indeed, had been his application and improvement that he was appointed by the Government, surveyor of the public lands in Texas. This exploration opened up to him another science that was just in its infancy. There were few works on geology when Mr. Lyon commenced the study, but he 'learned from the rocks.'

On his return from Texas he was appointed on the State geological survey of Kentucky with Dr. D. D. Owen, Prof. E. T. Cox, Leo Lesquereux and others, and it was on this survey that his eminent abilities as a geologist and topographical engineer were first made known to the scientific world. When hostilities commenced between the North and South, the United States Government secured the services of Mr. Lyon and he was attached to the command of Gen. Morgan, of the Fourth Kentucky Cavalry, as chief of the Engineering corps, and by his skill and particularly by his knowledge of the topography of Kentucky, rendered efficient service in the first campaign of the war. During this campaign, at Cumberland Gap, he received several wounds, from the effects of which he never recovered.

The home of Mr. Lyon on the Falls of the Ohio offered him peculiar advantages for the prosecution of his favorite studies. He devoted much attention to the Crinoidea of which he made a specialty, and his collection of crinoids is considered equal to any in the world. Mr. Lyon contributed several articles and drawings of new genera and species of crinoids, found at the Falls of the Ohio, to the Philadelphia Academy of Science. A large portion of the report of the Kentucky Geological Survey was also from his pen. The report of the Smithsonian Institute, for 1870, contains a contribution from Mr. Lyon upon the ancient mounds in Lyon County, Ky. For several years, however, his strength has not been equal to arduous work and he has devoted most of his time to study.

Mr. Lyon was eminently a self-made man. By persistent and earnest study, aided by a naturally fine intellect, he made himself one of the first scientists of this country, and his contributions to scientific knowledge have earned for him a lasting record in the roll-book of fame."

The Royal Danish Society of Science proposes the following questions for competition for the year 1872: — *Question in History.* There has been discovered in late years, in the central and northern parts of Europe, an astonishing quantity of Roman and demi-Roman antiquities of the first centuries of the Christian

era. In the march of civilization, these "finds" throw light on certain interruptions and oscillations which seem to proceed from great wanderings of peoples who, in their turn, appear to be connected with the definite establishment of the iron age in the north, and with the first complete colonization of the Scandinavian peninsula. In order to explain this question, the Society asks for a description of the principal Roman and demi-Roman "finds" in the countries of the central and northern parts of Europe, which were situated beyond the borders of the Roman Empire, and also desires that this description be accompanied by an argument based as much upon these archæological data as upon historical documents, from which may be known the extent and importance of the current of Roman civilization in the countries mentioned and especially the changes which its interruptions and final cessation have brought on, in the civilization and colonization of the north.

Natural History Question. — It is now a hundred years since the celebrated observations of O. F. Müller on agamous reproduction (gemmiparity) of the Naïades was published, and although there is no reason to question their perfect accuracy on all essential points, it is very desirable to have them resumed in the actual light of science and with the means which it possesses to-day. Schultze, Leuckart and Minor have furnished history with valuable contributions of the manner of reproduction of the Naïades properly called, as Claus and Lankester have of Chætogaster; nevertheless, science ought to be in possession of materials sufficient for intelligence on all points of which it is necessary to keep account. It is not known definitely what is the first origin of buds or first individuals, and the relations between the modes of gemmiparous and scissiparous reproduction consequently need to be better explained; complete evolution, from the moment when one Naïad leaves the egg to that in which, among the generations sprung from that Naïad, there are found again sexual distinctions, has not been studied in all its phases, and it is still a question whether the same individuals (zoöides) are gemmiparous and sexual, or if the sexual and agamous reproductions are strictly distributed over different individuals or generations. As for the other two groups of Anellides in which agamous reproduction has been observed hitherto, namely, the Syllides and the Sepulides, the question is almost at the same point. For these reasons, the Society desires to urge a thorough research, and one answering the

actual demands of science, of agamous reproduction and all the points pertaining to it, of one of the groups of these setiferous Anellides. It therefore offers its gold medal as a prize to the one who shall solve this question in a satisfactory manner, either for one or several species of the group of Naiades (comprising Chætogaster) or for one or several species of Syllides or Tubicolides. The papers should be accompanied by the necessary drawings explaining the points on which the researches have especially borne. The answers to these questions may be written in Latin, French, English, German, Swedish or Danish. The papers must not bear the name of the author but a motto, and must be accompanied by a sealed note, furnished with the same motto, enclosing the name, profession and address of the author. The members of the Society who live in Denmark do not take part in the competition. The prize awarded for a satisfactory answer to either one of the questions proposed, is the gold medal of the Society (value, about $100). Papers must be addressed before the end of the month of October, 1873, to the secretary of the Society, Counsellor J. Japetus Sm. Steenstrup, Copenhagen.

The Hassler Expedition left Talcahuana on the 25th ult. for Juan Fernandez where we spent two days about the island and one day lying in the harbor, called Cumberland Harbor, which gave us an opportunity of making a very satisfactory collection for the short space of time. As Prof. Agassiz and Dr. Steindachner were left at Talcahuana to proceed over land to Valparaiso, all the work at the island devolved upon myself, but considering all the disadvantages, our trip there was a profitable one and amply paid us for the trouble. Our course was a direct line to Juan Fernandez and back to Valparaiso, thus forming a triangular track and soundings were made both ways, the deepest being 2,410 fathoms. The weather was very beautiful and just the kind for enabling us to carry on our work to advantage. We spent May day on the island and with a fair wind reached Valparaiso on the 5th. We intended to remain here only two days, or just long enough to take on board our coal, but owing to several delays we shall be obliged to remain here one week. All the time here will be improved by the party to make as complete a collection as the time will allow and we are in hopes to do much in that direction.

We shall proceed from here to Callao where I suppose we shall arrive in nine days, from there to Panama, then Galapagos, etc. Soundings and dredgings will be continued and we hope to reap much scientific knowledge. Professor Agassiz is very well, excepting somewhat fatigued from his overland travel, and all the rest of our company are enjoying good health. The Professor was most successful in collecting during his travel from Talcahuana. — J. HENRY BLAKE. *Valparaiso, May 11th.*

THE meeting of the American Association for the Advancement of Science, as announced in our last number, will be held in Dubuque, Iowa, on Wednesday, August 21st. The meeting will be called to order at 10 A.M. by President Gray. After the usual formalities of organization, the general meeting will adjourn and the members will meet in their respective sections for organization, and as soon as this is accomplished, the reading of papers will be in order. The order of the last meeting, by which the retiring president will preside during the first day and deliver his address in the evening, will be followed at this meeting, as it seems appropriate to have the president's address, and the formal resignation of his chair to his successor, on the first day of the session. We trust that at this meeting of the Association, members will not forget the important bearing which a proper organization has upon its scientific success, for certainly at several former meetings sufficient attention has not been given to the formalities required by the carefully prepared Constitution of the Association. Especially should care be used in the nomination of the six members of the Standing Committee, the Permanent Chairman, Secretaries and Committees of the Sections. Every year there has been more or less complaint in regard to the admission of papers which were not worth the time they occupied, and at times papers have undoubtedly been excluded that had better claims for admission than others which were allowed to be read. This will ever be the case to a certain extent, from the very nature of the Association, but we feel convinced that if the following clause of the Constitution were strictly adhered to, many of these complaints would be avoided.

RULE 9. No paper shall be placed on the programme unless admitted by the Sectional Committee; *nor shall any be read, unless an abstract of it has previously been presented to the Secretary of the Section*, who shall furnish to the Chairman the titles of papers of which abstracts have been received.

Still another Rule of the Constitution, if properly attended to by the Standing Committee, would certainly save the Association from the discredit of publishing a few papers which a good natured committee had admitted to be read and discussed (sometimes with the hope that the discussion on the paper would induce its author to withdraw it from publication), but which have not the merit of "advancing science." The execution of this duty of the Standing Committee would also probably save the Permanent Secretary much disagreeable correspondence during the "printing period" after the meeting, and though it might reduce the size of the annual volume, it would certainly add to its value as well as to the credit of the Association. We allude to Section 11 of

RULE 4. Before adjourning, [it shall be the duty of the Standing Committee] *to decide which papers*, discussions, or other proceedings, *shall be published*.

Another important item in regard to the success of the meetings, and one to which every member having a paper to present and the Standing and Sectional Committees should give their hearty cooperation, is that of the daily programmes. The Constitution "requests" members to send the titles, with abstracts of their papers, to the Permanent Secretary, at least a day previous to the commencement of the meeting; but there is often great delay in getting the list of papers presented in type, and still greater in arranging the programme for each day. This might be avoided by passing a vote providing that papers on the Secretary's list, at the meeting of the Standing Committee the evening before the first general session, should have precedence over all others in making up the programmes by the Sectional Committees. It would also greatly facilitate matters if the Sectional Committees were obliged to give their programmes for the day following to the Permanent Secretary by 4 o'clock in the afternoon previous, and the programme for the first day immediately after the organization of the Sections, not allowing papers to be read in a Section until its Committee had fully prepared the programme for the day; for it is almost always owing to the little confusion in calling up the first papers, without proper announcement, that renders it so difficult to get smoothly started in the scientific work, while a recess of an hour to enable the Committee to prepare the programmes would save much more time to the section than thus taken, and would give members a chance to greet each other before real work commenced.

The following are the officers of the Dubuque meeting. *President*, J. Lawrence Smith of Louisville, *Vice President*, Alex. Winchell of Ann Arbor. *Permanent Secretary*, Joseph Lovering of Cambridge. *General Secretary*, E. S. Morse of Salem. *Treasurer*, W. S. Vaux of Philadelphia. *The Standing Committee* consists of the above named officers and the following officers of the preceding meeting, Asa Gray of Cambridge, G. F. Barker of New Haven, and F. W. Putnam of Salem. (Six more members of the Standing Committee are elected at large from the Association on the first day, and the Permanent Chairmen of the Sections become members of the Committee.) *Local Committee.* — H. T. Woodman, chairman; C. A. White, 1st vice chairman; Asa Horr, 2d vice chairman; Samuel Calvin, local secretary; E. D. Cook, assistant secretary; R. A. Babbage, treasurer; and 205 other gentlemen. We are convinced by the cordial tone of the circular of the Local Committee and from private letters received, that the citizens of Dubuque are resolved to spare no effort on their part to make the 21st meeting of the Association a decided success. We quote the following items from the circular: —

On the evening of Wednesday, August 21st, a reception will be extended to the Association by the Hon. Wm. B. Allison, U. S. Senator elect, and Chairman of the Committee of Reception. Response from the Association, after which Prof. Asa Gray, retiring President of the Association, will deliver his address and give up the chair to his successor. From the success that has already attended the efforts of the Special Committees, and the expressed determination of the citizens to extend a liberal hospitality to the members, we can confidently promise that all can be entertained at private residences, *free of charge*, during the session. The Local Committee, therefore, earnestly request those intending to be present to notify the Local Secretary by letter as soon as possible. Members and those intending to become members will report immediately upon their arrival at the Reception Room of the Local Committee and register their names, when they will be conducted to the places to which they have been assigned. Notice of the location of the Reception Room of the Local Committee will be posted at the railroad depots, steamboat landings, and in the street cars and omnibuses of the city. Negotiations with the railroads have now progressed so far as to make it almost certain that we shall be able to give return passes over all the principal lines. All railroads leading from the city have generously offered the use of their lines for excursions to localities of special interest. Steamboats on the Mississippi river have also been tendered for a similar purpose. Arrangements for a number of excursions have been made, subject to the approval of the Association. Carriage excursions to the lead and spar caves, smelting furnaces, and to the exposures of fossiliferous rocks will also be provided for. Microscopists will confer, as soon as possible after their arrival, with the Curators of the Iowa Institute of Science and Arts at the Reception Room of the Local Committee, in relation to the care of any instruments or specimens they may have for exhibition.

"NATURE" for June 20th opens with a résumé of the discoveries of Livingstone, and gives an account of the latest authentic reports, which place him at Unyanyembeh, where stores were

being sent him under charge of his son. It is Livingstone's purpose to go southward and discover the outlet to the great basin of the Tanganyika, extending from about 3° to 10° S. lat. and 27° to 39° E. long., which he had discovered, and explored on all sides except the southeastern.

ANSWERS TO CORRESPONDENTS.

F. C. H., Yellow Springs, Ohio.— It is not at all improbable that some *Tachina* parasite infests *Coreus tristis* De Geer. It is well known that beetles in the imago state are sometimes so parasitized, and we have bred a small *Tachina-fly* from *Cassida auricha-cea* Fabr. See also AMER. NAT., Vol. V, p. 217. We should like specimens from *Coreus tristis*. — C. V. R.

Mrs. P. H., New Haven.—The specimens of insects you sent to the NATURALIST, and which you found in such numbers on May 20th, are doubtless the *Termes frontalis* Haldeman (order Neuroptera), and are called the American white ants. The workers and females are white and wingless. The males, which are mostly black and winged, appear in May and June and for a few days are often seen in countless swarms. These insects live in moist, decaying wood only, and doubtless found a congenial home under the doorstep mentioned. — E. S.

BOOKS RECEIVED.

Proceedings of the California Academy of Science. Vol. iv, Pt. iv, 1871. San Francisco. 1872.

Rectification of T. A. Conrad's "Synopsis of the family of Naiades of North America." By Isaac Lea. 8vo pamph. New Edition. Philadelphia. 1872.

Report of the Entomological Society of the Province of Ontario, for the year ending 1871. 8vo pamph. Toronto. 1872.

Preliminary Report of the United States Geological Survey of Montana and portions of adjacent Territories, being the 5th Annual Report of Progress. By F. V. Hayden, United States Geologist. Conducted under authority of Secretary of the Interior. 8vo. pp. 398. Illustrations and Maps. Government documents. Washington. 1872.

Annual Report of the Indiana Horticultural Society, Proceedings of the eleventh annual session held at Indianapolis, Jan., 1872. 8vo cloth. Indianapolis.

Natural History of the Tres Marias and Socorro. (From the Proceedings of the Boston Society of Natural History. June 7, 1871). By Andrew J. Grayson. 8vo pamph.

Amnesic and Ataxic Aphasia, etc. By T. M. B. Cross, M.D. 8vo pamph. Louisville. 1872.

Descriptions of New Species of Fossils from the vicinity of Louisville, Kentucky, and the Falls of the Ohio. From the collections of Dr. James Knapp of Louisville. By James Hall and R. P. Whitfield. 8vo. 8 pages. May, 1872.

Hypotheses. By F. J. Finois. 8vo pamph. pp. 32. 1872.

Nos Silicon Steel. 8vo pamph. Rome. 1872.

Custodian's Report of the Boston Society of Natural History for the year ending May 1, 1871. Boston. 1871.

Remarks on the Nomenclature of Achromatic Objectives for the Compound Microscope. By Dr. J. J. Woodward, U.S.A. 8vo pamph. (From the American Journal of Science and Arts, Vol. iii. June, 1872.)

On Reversions among the Ammonites. By Prof. A. Hyatt. 8vo pamph. 1870.

Catalogue of Sphenisceæ. By Alpheus Hyatt. 8vo pamph. (From the Proc. Bost. Soc. Nat. Hist., May 17, 1871.)

Monographie des Poissons de Cuba Compris dans la sous-famille des Sparini. Par Felipe Poey. (Extrait des "Annals of the Lyc. Nat. Hist. of N. Y.," Vol. x.) 1872.

Fifth Annual Report of the Provost to the Trustees of the Peabody Institute of the city of Baltimore, June 6, 1872. 8vo pamph. Baltimore. 1872.

Annual Report of D. F. Boyd, Superintendent of Louisiana State University, for the year 1871, *to the Governor of the State of Louisiana.* 8vo pamph. New Orleans. 1872.

Description of the Balænoptera Musculus in the possession of the Bost. Soc. Nat. Hist. By Thos. Dwight, Jr., M.D. 4to pamph.

Tri-Daily Bulletin and Tri-Daily Weather Map, issued at the War Department, Office of the Chief Signal Officer, June 1, 1872. 3 copies each.

Descriptions of New Species of Fossils from vicinity of Louisville, Ky. From the Collection of Dr. James Knapp. By James Hall and R. P. Whitfield. (Continued.) pp. 8. 8vo. June, 1872.

Proceedings of the Academy of Natural Sciences of Philadelphia. Part 3. Oct.-Dec., 1871. (Recd. July 1, 1872.)

History of the Names Cambrian and Silurian in Geology. By T. Sterry Hunt. (From the Canadian Naturalist, April and July, 1872.) 8vo. pp. 64.

Fossil Cephalapods of the Museum of Comparative Zoology. Embryology. By A. Hyatt. (Bulletin of Museum of Comparative Zoology, Vol. iii, No. 5, July, 1872) 8vo, pp. 59-112. 4 plates.

The American Journal of Science and Arts. Third series. July, 1872. New Haven.

Nature. Nos. for June and July, 1872. London.

The Academy. Nos. for June and July, 1872. London.

The Field. No. for July, 1872. London.

La Revue Scientifique. Series 2. Nos. 50-53, 1872. Paris.

Bulletin of the Torrey Botanical Club. Vol. iii. No. 6. June, 1872. New York.

Journal of Botany. No. 114. June, 1872. London.